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PC WORLD

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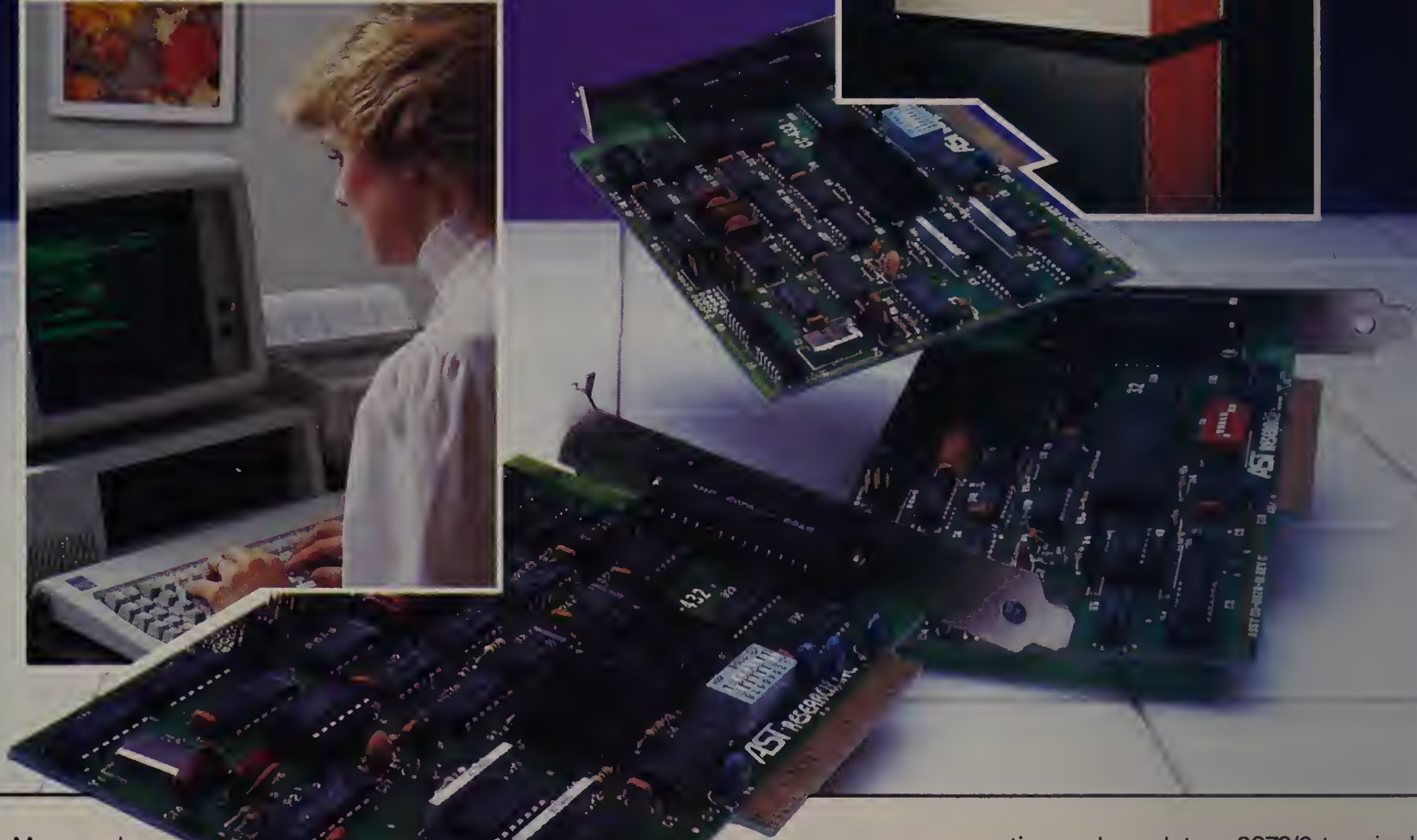

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AST-PCnet II Local Area Network

PC WORLD

The Comprehensive Guide to IBM Personal Computers and Compatibles
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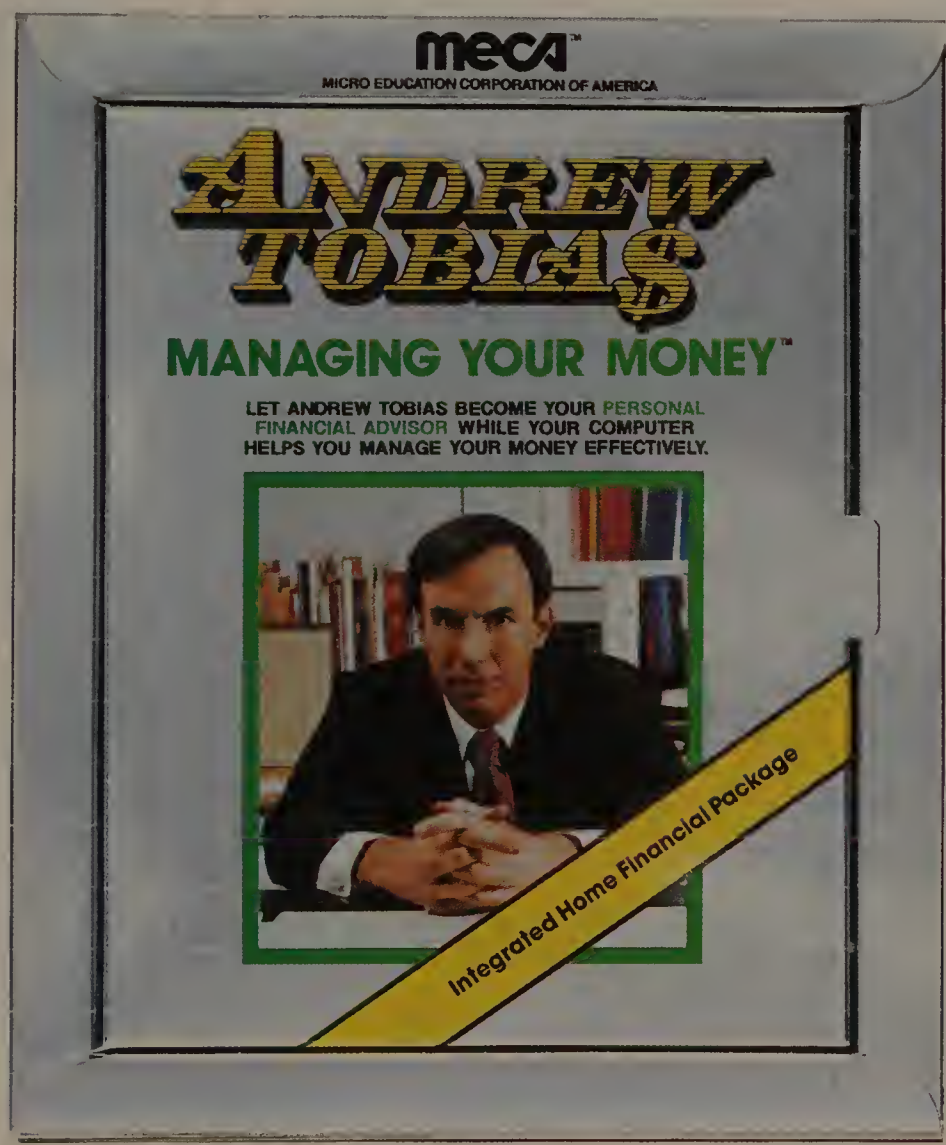

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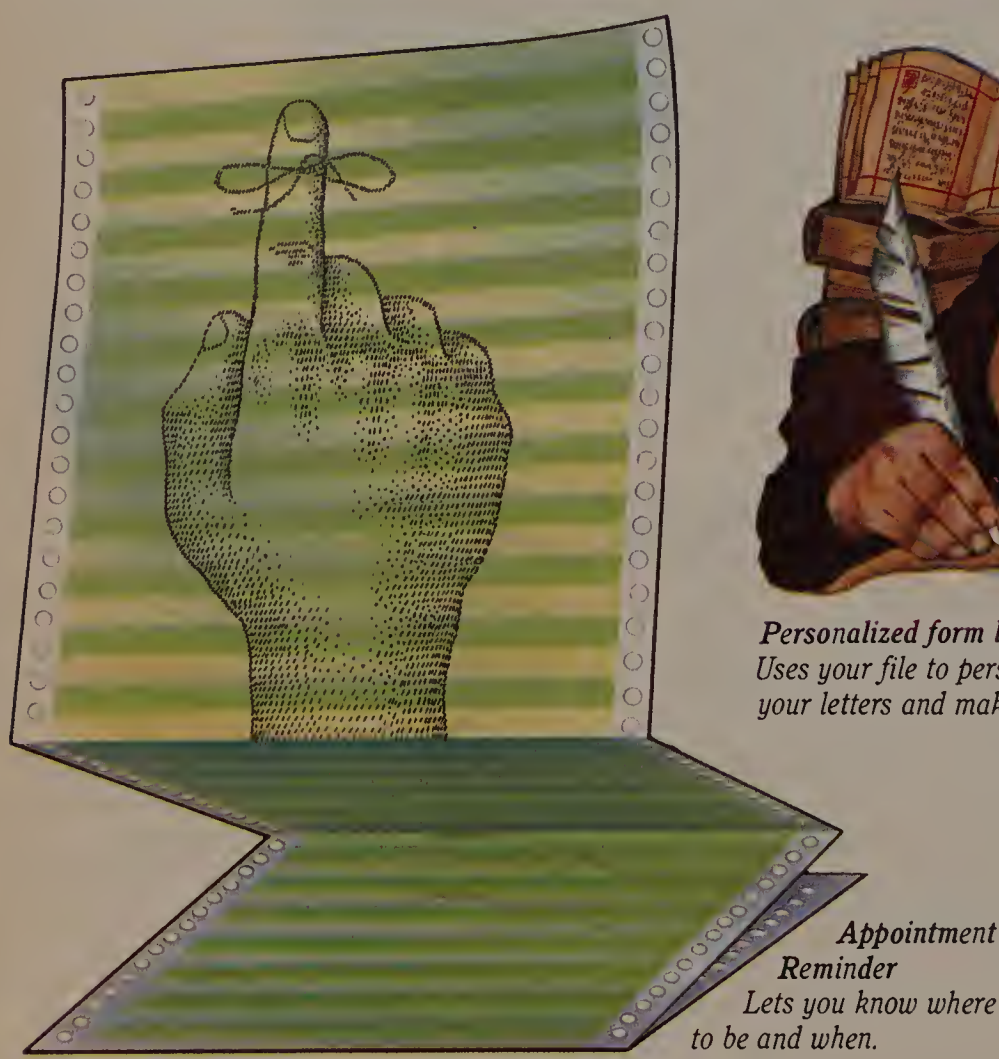

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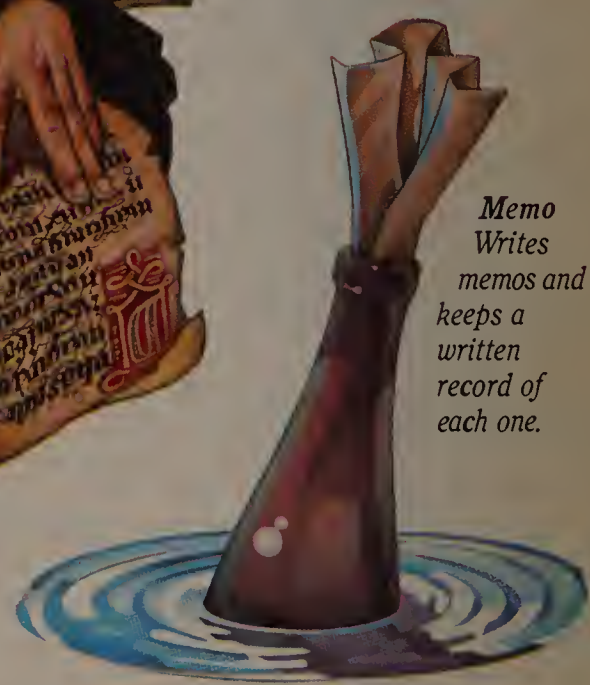

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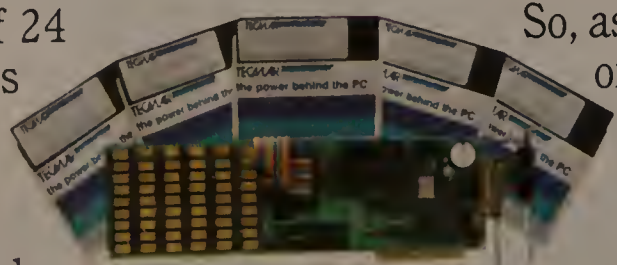

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Winter: Here at Last!

David Bunnell

The personal computer industry and the publishing market that has grown up around it have survived the summer slump; now they are a little leaner but still strong.

In the personal computer industry, summer has always been bad for business. People spend more time at the beach and less time in computer stores or in front of their computer screens, and businesses make fewer purchases of hardware and software. The result of the fun-and-sun months is an inevitable slump in the industry.

The summer of 1984 was particularly bad. The overall growth of the personal computer market suddenly leveled off, well below most projections. Software sales plummeted, and talk of "the shakeout" intensified. Of course, this merely reflects the ecology of the personal computer industry—when fewer computers are sold, fewer software programs are sold; the decrease in hardware and software sales leads to fewer hardware and software companies; and all these factors lead to fewer advertisers, which means fewer computer magazines.

The pressure on computer magazines increased when several large software companies decided to switch their advertising dollars to television and the general-business press. The software magazines were the first to suffer. Just when *Personal Software* was given a new editorial slant and an appealing redesign, the shakeout undertow caught it. Hayden Publishing pulled the surfboard out from under the magazine, and suddenly its editors and writers were in over their heads.

Shortly thereafter the waves got very rough. Ted Leonsis, publisher of *List*, received a call from parent company International Thompson Business Press, saying that if *Personal Software* couldn't stay above the surface, *List* couldn't either as a monthly. The upshot: *List* dropped from 12 to 2 issues a year. While there were many reasons to maintain that the software business would turn around in the fall when computer sales picked up, some publishers didn't have enough commitment to ride it out—the combination of the shakeout scare and the increased TV ad competition was too much to handle.

The summer magazine shakeout was intensified by other factors, such as IBM dragging its feet to enhance the PCjr. Unfortunately, the PCjr wasn't improved in time to save *Jr* and *Peanut* magazines. Without public interest in a machine, product-specific publications die. To its credit, Ziff-Davis managed to hang in there with *PCjr.*

Personally, I felt that the saddest "wipeout" was *Digit,* a lively, well-conceived computer magazine for kids. Published by Lassie Benton out of her San Francisco garage, *Digit* had the same wholesome, yet revolutionary, spirit that has been vital to both the birth and the growth of personal computing. Several other kids' magazines also went under. Ironically, these publications could have played a central role in the spread of computer literacy and the renaissance of education. Apparently, the educational vision was blurred when the tides washed away.

Computer-specific magazines that are aimed at the IBM PC market seem to be doing well. Although sales of PCs and PC compatibles have slowed, they haven't dropped as drastically as have sales of other personal and home computers. Neither *PC World* nor *PC* grew in pages as they have in the past, but both stayed nice and fat. However, *PC Age* and *Softtalk* just couldn't stay afloat–both sank just when the shore seemed reachable.

Even though we're all competing, we have mutual respect, and it's regrettable to see others drown. *Softtalk* was one of *PC World*'s favorites. We often heard it applauded for its technical excellence, and most of our editors and writers read it regularly. In fact, the few readers who said they liked a magazine better than *PC World* turned out to be fans of *Softtalk*. We'll miss this publication as well as its Apple version.

As sentimental as I am about magazines, I realize that this shakeout was destined to occur. Dynamic markets behave this way: the tide inevitably rushes in and crashes against the rocks. Beginning in the fall of 1983, publishers seemed to be tossing computer magazines onto the newsstands as fast as they could dream them up and hire a couple of editors to churn them out. Of the more than 200 computer magazines generated during this period, many were editorially weak and deserved to die. Alas, the shakeout gods have no mercy. In the process of sealing the fate of the unworthy, the gods also destroyed several good publications.

Now that winter is here, personal computer sales are blooming. As Apple likes to remind us in its advertising, "Of the 235 million people in America, only a fraction can use a computer." There are more than 200 million potential users to attract. With the addition of the PC AT and the enhanced PCjr, the IBM-compatibles personal computer market will continue its fantastic growth–giving us plenty of news to investigate and write about.

The shakeout scared us, and we don't want to tempt fate and gloat about our competitors' misfortunes. While other computer magazines rode the waves, *PC World* established itself as the number one magazine in the PC and PC-compatibles category. While others hit the reefs, we were busy launching foreign editions. To date, we have launched editorially independent editions of *PC World* in seven foreign countries–France, Germany, England, Canada, Australia, Sweden, and Japan.

Naturally, our success relies on our ability to continue publishing a highly useful magazine, one that you find worth subscribing to or buying on the newsstand. At *PC World,* we are dedicated to helping people understand and get more out of their personal computers. We hope our dedication shows, because we depend on the continued growth and support of our readers. Don't be shy about telling us what you think we are doing right and wrong; we're not too proud to listen. Thank you reader, and thank you winter. It's nice to have you back–I hope you agree that snow skiing (like computing) is a lot more fun than surfboarding.

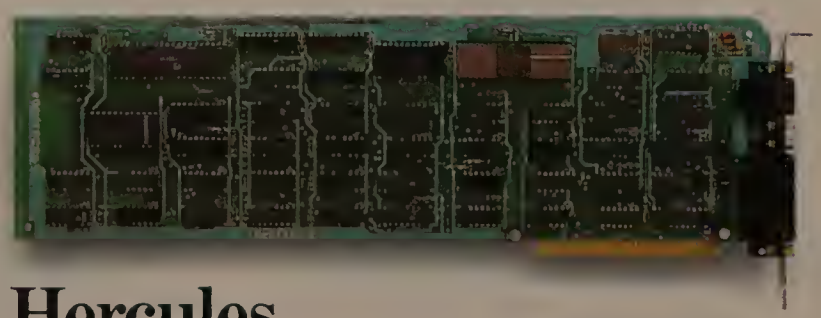
And you thought we only ran 1-2-3.

Hercules™ is famous for being the only high resolution graphics card authorized by Lotus™ to run 1-2-3.™ Now we are the only graphics card authorized to run a couple of other programs you may have heard about —Symphony™ and Framework.™

When these hot new programs wanted hot graphics, they chose to support the undisputed leader, Hercules. When you've sold over 100,000 graphics cards, the world takes notice.

At Hercules, we believe that the most important feature in a graphics card is that it should run lots of software —with true full-screen, high resolution graphics on the IBM® PC Monochrome Display. So when you buy a Hercules Graphics Card, you can rest assured that it will run more high-res graphics software than anyone else. Even on the new AT.™

Call **800 255-5550 Ext 401** for the name of the Hercules dealer nearest you. See why the company that made the first graphics cards for the IBM PC still makes the best.



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Circle 77 on reader service card

HOW THE MANAG
BIGGEST BUSINESS PU

"With four billion customers and the world's biggest inventory, it's a wonder I'm out the door on time each Christmas Eve.

"But this year, I'll have time to spare. That's because I've got Clout™—the new software program from Microrim® that lets me conveniently get at information from every department in my company.

"How conveniently? By letting me ask questions of my personal computer in my own words. Just like I'm talking to you now."

"IT WRAPS UP FILES FROM LOTUS 1-2-3,™ PFS:FILE,™ DBASE II,™ OUR MAINFRAMES AND MORE."

"Besides the shop up here at the Pole, I have to oversee manufacturing plants all over the world. And at each facility, they keep track of their work by using the leading productivity packages on the market today. Including Microrim's own R:base™ DBMS software.

"In the past, it used to be near impossible to pull

ER OF THE WORLD'S
LLS IT ALL TOGETHER.

information together from different sources, without re-entering every bit of the data. But the new Clout takes data files directly from these programs—plus ASCII, DIF, and SYLK files, too. So I can get information from other PCs by sharing floppy disks. Or being part of a LAN. Clout can even read files which have been transmitted from the company mainframe or another PC.

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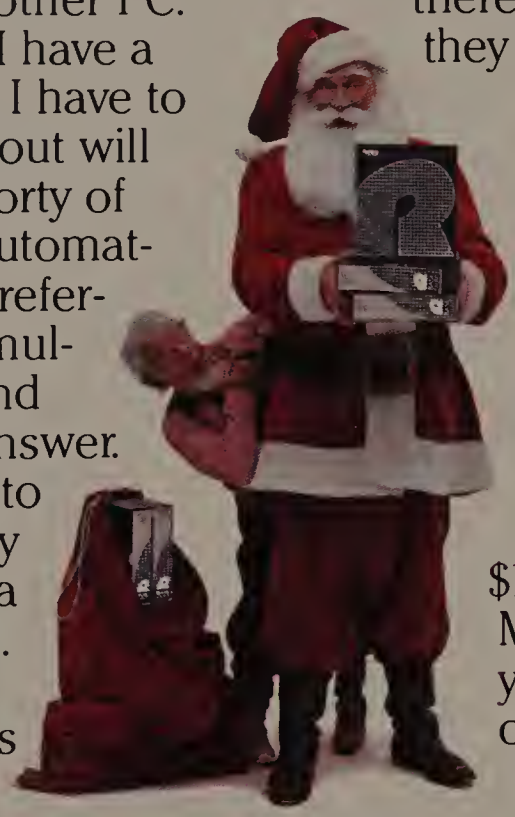

"'WHICH WAREHOUSES SHIPPED MORE RED AND GREEN ARGYLE SOCKS THAN PLANNED?'"

"Try typing that into any software package you know. Using exactly those words. Likely all you'll get is a blank stare from the screen.

"But with Clout, I get a clean, crisp list. No computer jargon. No need to check it twice. Just straightforward answers.

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COMPAQ PRESENTS

How To Do More With Less

It used to be that when you wanted personal computers to do more, you added peripherals. A fixed disk for storage. A second monitor for graphics. A backup system for data protection. And slowly the octopus devoured your desk.

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All that makes COMPAQ DESKPRO the most expandable PC you can buy. And thanks to some ingenious engineering, the COMPAQ DESKPRO displays high-resolution text *and* graphics on one monitor, not two. It also runs thousands of business programs made for the IBM® PC and *XT* straight off the shelf—a full two to three times faster than older, slower computers. So you can run the most complex software this side of mainframes quicker than you can say, "1-2-3."

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Circle 830 on reader service card

REMark: The Luddite Legacy

William Rodarmor

A perfection of means and a confusion of ends seem to characterize our age.
—Albert Einstein

If you want to be pushed around by a machine, try cooking macaroni. A microwave oven that's on the market today comes with a personal name and is pretty touchy about its moniker. To get the oven to heat something up for lunch, you have to say, "Bob, cook the macaroni." If you say, "John, cook the macaroni," it replies, "My name is not John, my name is Bob."

Being corrected by a microwave oven is annoying, but dealing with machines that talk back is actually nothing new—I devote a major part of my creative efforts to composing punchy messages for my telephone answering machine. Most of us accept high technology and its trade-offs as a natural part of American life in the eighties. But there are unreconstructed Luddites among us, and they are making themselves heard.

In the early 1800s the followers of Ned Ludd earned enduring fame by wrecking industrial machinery, accurately sensing that the Industrial Revolution would lead to the replacement of individual craftsmen and an increase in unemployment. A nineteenth-century Monkey-Wrench Gang, the Luddites employed a favorite tactic of jamming industrial looms with their wooden shoes—*sabots* in French—thereby giving us the word *sabotage*. Their modern-day heirs pass the word that the best way to "do in" a computer keyboard is to douse it casually with sweetened coffee.

"I used to really hate computers," said an otherwise perfectly modern young woman, "and I refused to use those automatic teller machines, because I thought they were really alienating." The woman, Audrey Godell, is the program information manager for the California office of The Nature Conservancy. Ironically, she now uses computers to track and identify vanishing parts of the natural world, but Godell still harbors ambivalent feelings about modern technology.

Godell's attitude reflects feelings that are more widespread than most PC fans would like to

admit. Computerphobia and utility bill errors aside, people have fundamental gripes about the new silicon gods. Many people believe that computers cheapen human creative effort.

Stan Pesick, a high school teacher in Oakland, California, has doubts about the current emphasis on computers in the school system. People in education look to computers as some sort of panacea, he said. They think that if you hook up students to these machines, the students will automatically learn. "I think that that's simplistic, to say the least."

Pesick's students often say they want to be computer programmers, but he thinks they don't have the slightest idea of what that really means. "People tell these students, 'Learn how to use computers—that's where the job market is,'" he said. "Actually, most of them are being trained for simple data entry, and in lots of ways that's a dead-end street." People often find that kind of work boring, Pesick added.

Among artists, feelings are mixed. Some, like performance artist Darryl Sapien and choreographer Betsy Erickson, embrace new technology. Last year, Sapien and Erickson joined forces to produce a stunning computer-animated set for the San Francisco Ballet's *Pixellage* (the name comes from *pixel*), and audience applause was deafening.

Other artists, however, like writer Thaisa Frank, reject computers. Frank, who teaches creative writing at the University Extension of the University of California, Berkeley, has found that writing on a computer produces manuscripts whose only virtue is impeccable printing. She thinks that word processing bypasses a laborious part of the craft that is essential to a quality piece of fiction. "The process of revising a manuscript by hand seems to let the writer hear the spirit in the story," Frank said. She claims that if a computer does the work instead of a writer, the piece suffers.

"When you revise a story by taking out paragraph A and putting in paragraph B, it's almost as though you're doing an organ transplant. A story has automatic antibodies that often reject a transplant," she said. "In my writing classes, I find that the stories that have the most transplants are the stories that were written on computers."

Taking a broader view, critics are increasingly afraid that people will rely on technology to fill a void in their lives. "I worry that machines are replacing the creative function in people," said psychologist Carol Ellis. "People who would once have sat home and either talked to each other or made an incredible quilt will instead plug into little machines to meet different needs.

"Some people will take advantage of machines to enhance the creativity they already have," said Ellis, "but I think a lot of people will just use them to dull their senses further. I went to a park with a young friend the other day and saw a mother listening to her Sony Walkman while her baby was playing. I'm convinced that having something stuck in her ear made the woman a little less there."

Computerphobia and utility bill errors aside, people have fundamental gripes about the new silicon gods.

I suppose we ought to be tolerant of those misguided folks who think that PC stands for "Poetic Consciousness" or imagine that fingers are made for something other than tapping on a keyboard. Quaint though their ideas sound, some of them are worth listening to—especially if we care about staying human. We always have the option of cooking macaroni the old-fashioned way; it tastes just as good, and it doesn't talk back.

William Rodarmor is a Bay Area journalist and radio reporter.

For personal computers that
have been very, very good this year...

Fun and games from IBM.

Just in time for the holidays, IBM presents a batch of entertaining software programs for every IBM personal computer (and every IBM personal computer person) on your gift list.

If it's pure fun and games you're after, or educational programs cleverly disguised as fun and games, you've come to the right ad. (If, on the other hand, your only interest is a spreadsheet or database manager, just remember what they say about all work and no play.)

Except for IBM PC*jr* ColorPaint, all the programs here cost less than $50.* And all are available through IBM Product Centers and authorized IBM Personal Computer dealers. For the location of the store nearest you, just call 1-800-447-4700. In Alaska or Hawaii, 1-800-447-0890.

Arcade Games

Jumpman™
You have to defuse hundreds of bombs to save the Jupiter Command Center, but be careful. The bad guys are shooting live ones. Requires color display or TV, joystick optional.

Mine Shaft
You have a little problem. Floodwaters have short-circuited your robot miners, and now they're running berserk. PC*jr* only. Requires color display or TV, joystick optional.

SHAMUS™
Find and eliminate the evil Shadow. 128 rooms and all manner of ill-mannered creatures stand between you and your goal. Requires color display or TV, joystick optional.

Crossfire
The streets are crawling with giant spiders. Your city is counting on you. Good luck. PC*jr* only. Requires color display or TV, joystick optional.

ScubaVenture
Dive for sunken treasure and live to tell about it. Maybe. PC*jr* only. Requires color display or TV, joystick optional.

Adventure Games

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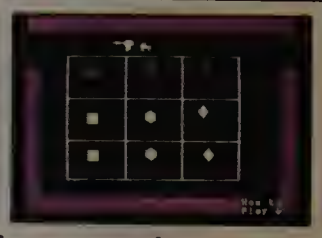
Save the Kingdom of Daventry from certain doom. An adventure game with advanced graphics, plus music and sound effects. PC*jr* only. Requires color display or TV.

Zyll
Explore the castle of a wicked sorcerer as a warrior, a wizard or a thief. A text adventure game for 1 or 2 players.

Education Programs



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Juggles' Butterfly™
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Bumble Plot™

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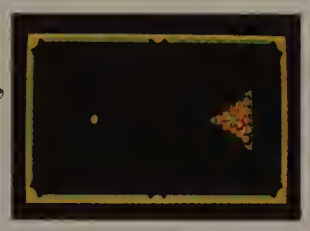
Serious Fun

PC Pool Challenges



If you don't have room for a pool table, this is the next-best thing. 1 to 4 players. Requires color display or TV.

Touchdown Football

Realistic football action. Call your own plays against an opponent or the computer as the crowd cheers you on. PC*jr* only. Requires either color display or TV, and joystick.

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5,000 trivial questions in more than 200 trivial categories. Up to 14 players (or teams) compete against each other and the clock. Requires color display or TV.

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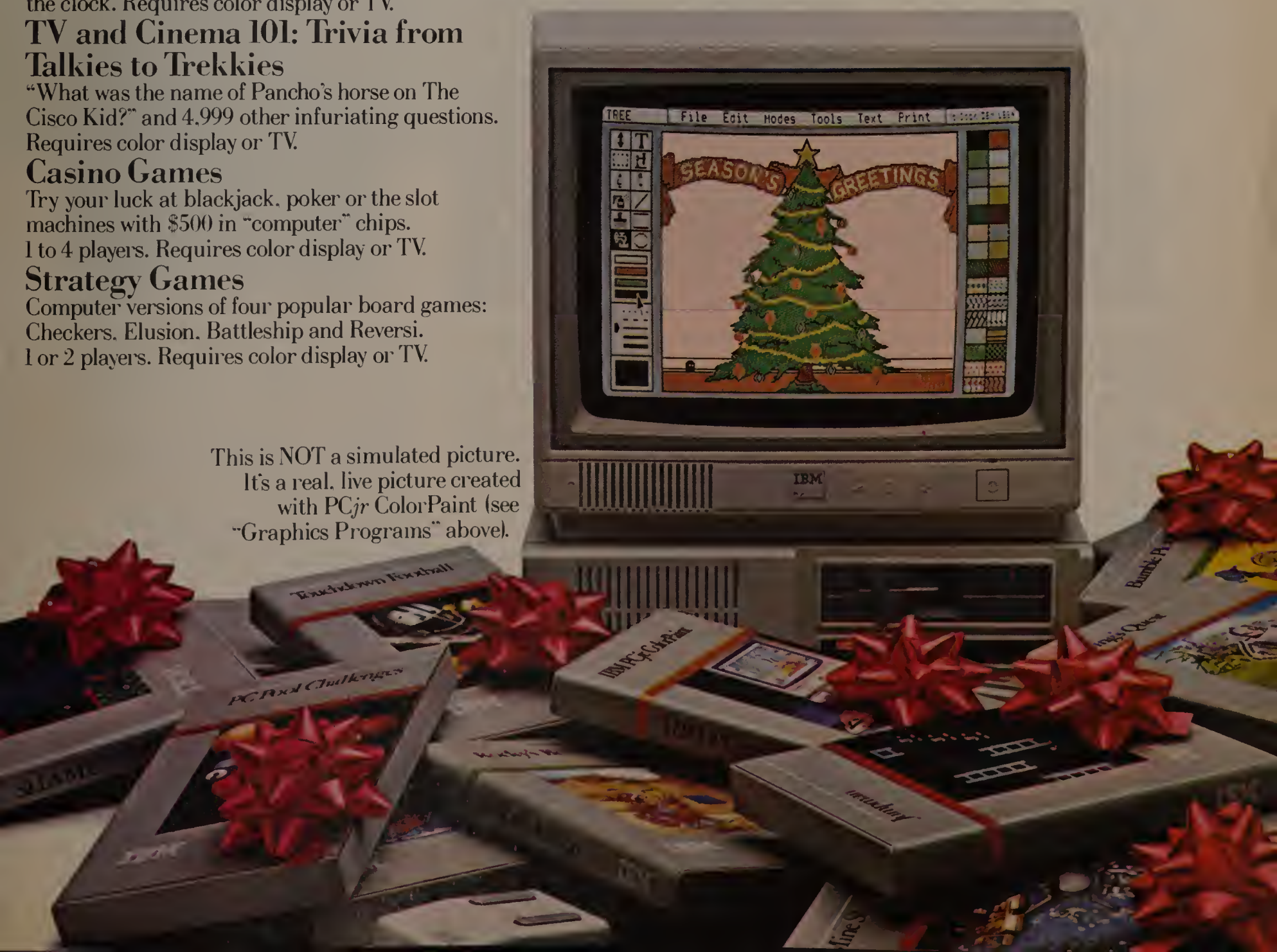
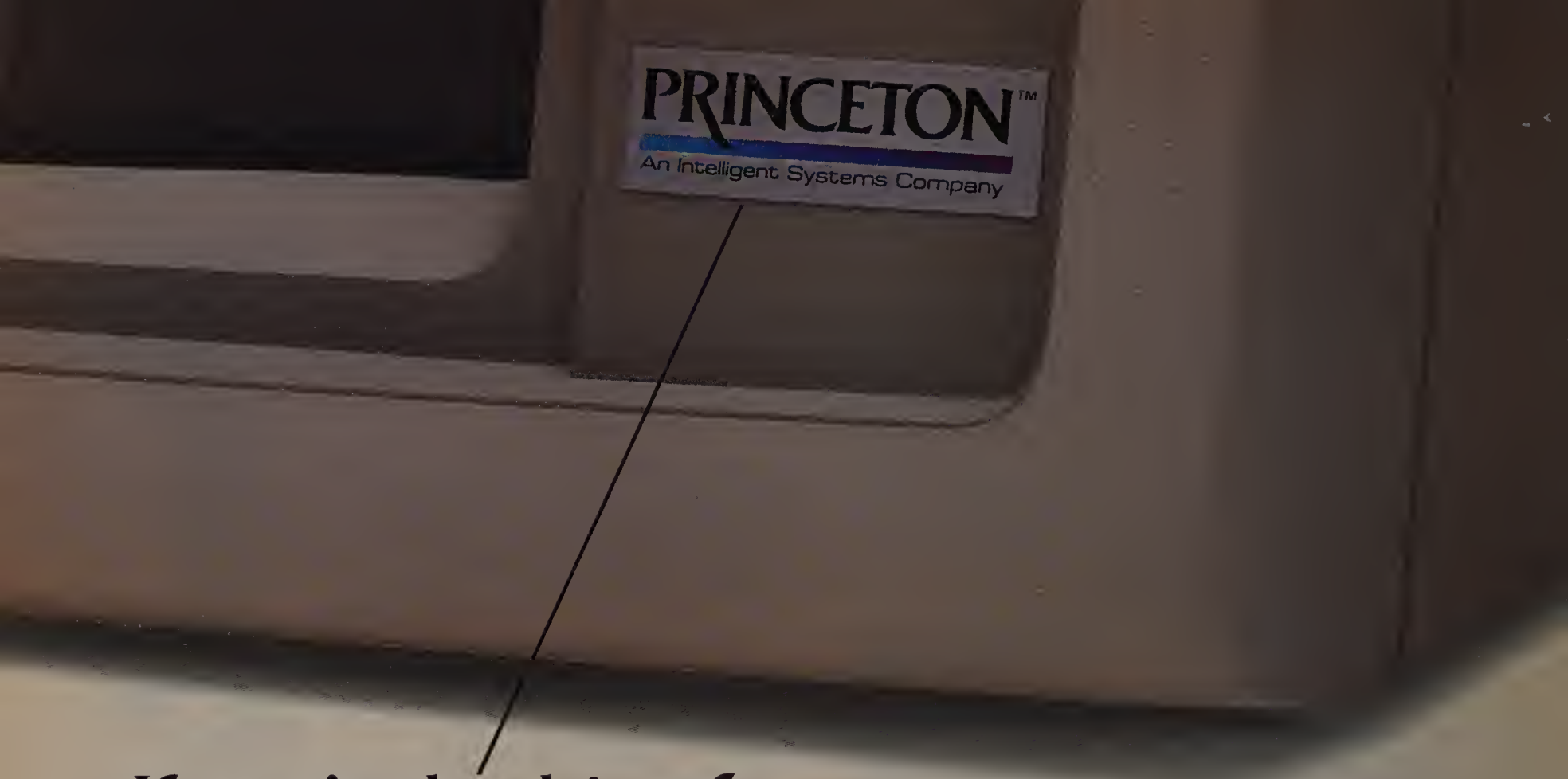


This is NOT a simulated picture. It's a real, live picture created with PC*jr* ColorPaint (see "Graphics Programs" above).



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HX-12. A high resolution monitor at a medium resolution price.

HX-12 is a high resolution RGB color monitor that's colorful enough for all your graphics needs and sharp enough for word processing.

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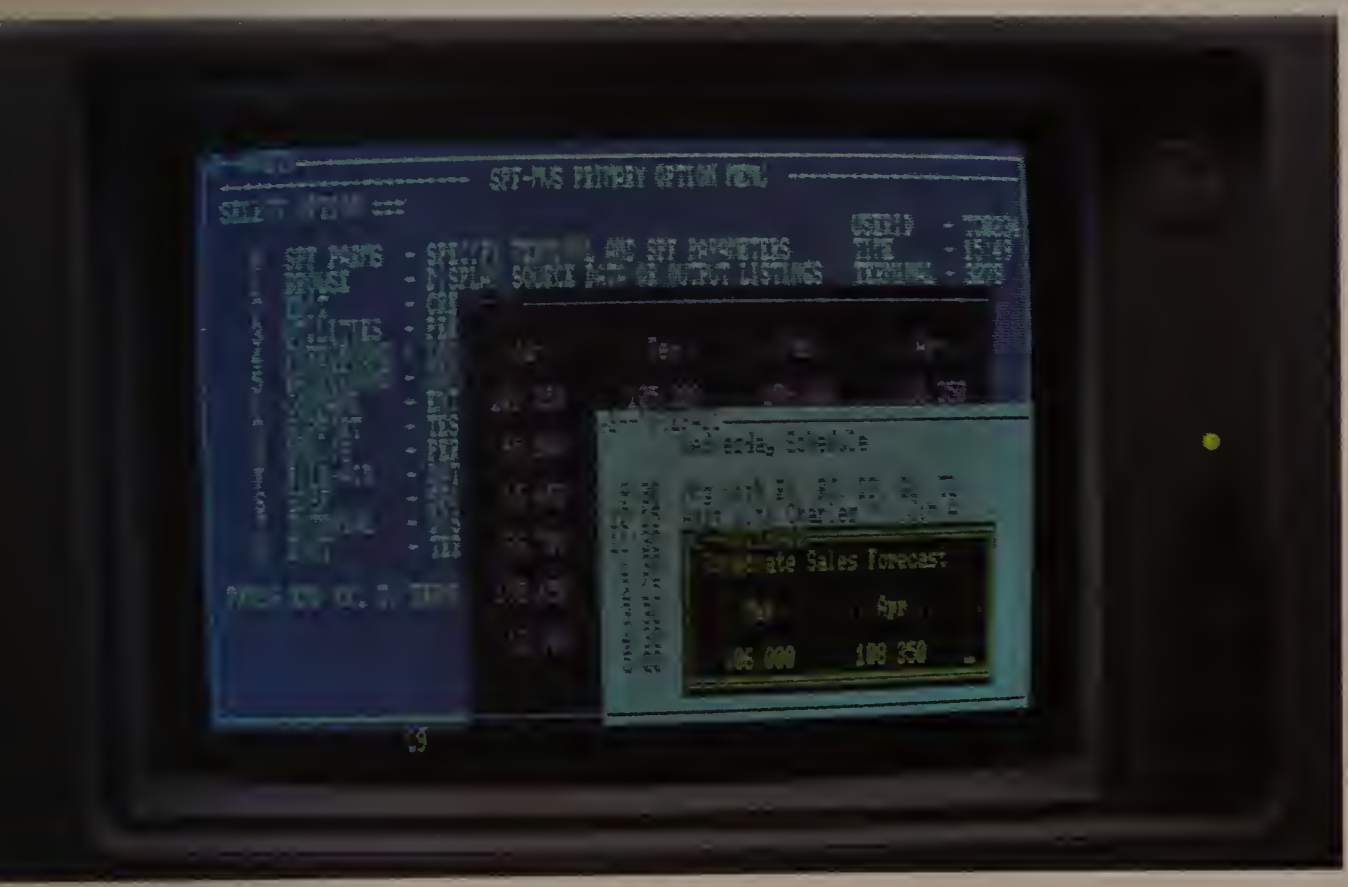
Compared to this, other 3278/79 emulators aren't much to look at.



Look closely.

This isn't your everyday 3278/79 emulator. Ours gives you much more to work with. Namely, a host session, a PC DOS session and two notepads. All on the same screen. At the same time.

We call it the CXI 3278/79 PLUS PC connection.

Fortunately, it's easier to use than it is to say.

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But perhaps the biggest advantage of our emulator board is its small size. It's just five inches long. (Or short, depending how you look at it.) Which means it fits conveniently into a PC's short expansion slot. Leaving the long slots for the rest of the world.

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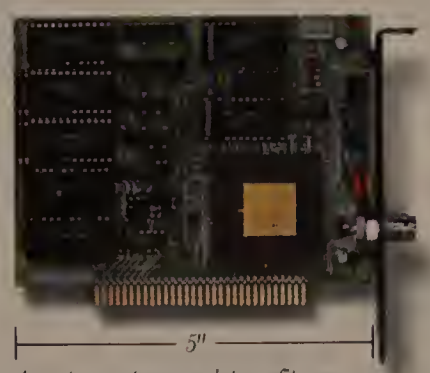

A custom gate array lets us fit our 3278/79 emulator on a 5" board and still offer more capability than all the rest.

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$995 includes board and software

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Letters

Reactions and responses from the PC World community

Dialog on Dialog

As a frequent user of Dialog and as a fan of the *In-Search* software, I feel obligated to correct a couple of implications made in the *In-Search* review that appeared in the August issue [*From the Software Shelf, PCW*, Vol. 2, No. 9].

First, the reviewer states that "professionals will find *In-Search* more thorough and faster than spending an afternoon in their local card catalog. . . . " This is not necessarily so. As wonderful as Dialog is, and as convenient as *In-Search* is, they are not a substitute for manual research. It is incorrect and self-defeating to assume that the only information worth having is in machine-readable form or indexed in machine-readable data bases. While it is true that many scientific disciplines require only the most current data, the study of the humanities, for example, still relies on relatively old sources that are not completely covered by on-line data bases. There will never be a total substitute for manual research in art, literature, and philosophy. Anyone who assumes that such a substitute already exists has crippled his or her ability to do effective research.

Second, the reviewer suggests that before *In-Search*, Dialog was usable only by "libraries, institutions, or wealthy Ph.D. candidates." Although *In-Search* simplifies the Dialog commands and reduces on-line time, users still pay the data base royalties and print charges in addition to the $399 for *In-Search*. For the casual user—namely any user other than libraries, institutions, and Ph.D. candidates—the cost of the software may not be outweighed by the reduction in Dialog charges.

In-Search, while an excellent product, will probably not expand the universe of Dialog users as greatly as the reviewer has implied.

Wendy W. McLean
Paoli, Pennsylvania

Maligned and Misunderstood

Regarding David Bunnell's column from the September issue [*PCW*, Vol. 2, No. 10], I believe the PCjr is still the most maligned and misunderstood computer on the market.

I owned a PC and bought a PCjr for backup and for home use. After seeing what a PCjr could do, I recently sold my PC and use an enhanced PCjr instead.

I have a 128K disk system with the 128K Tecmar jrCaptain board and the Key Tronic 5151jr keyboard. I use a Panasonic monochrome display with the speaker so I can utilize the three PCjr voices. The entire system cost about $1400, discounted from a local retailer before the price decreases. For the price, you can't beat the features of integrated adapters, cheap modem upgrade, and compatibility.

The only inconvenience is the single disk drive. Consequently, I use one-load software like *VisiCalc* or *PC-Write* (the Tecmar board gives a 207K contiguous work space). Copying a disk requires only two swaps, which is endurable. Plus I can even run *VisiWord*, version 1.0, giving me access to all my old PC test files.

Now that the add-ons are out and working, I can't imagine any user buying a PC unless two disks are absolutely necessary and RAM disks aren't feasible. Otherwise, the PCjr is the best IBM buy for most individuals' needs. The PCjr has been fixed–by other vendors, even before IBM added its own enhancements.

Kenneth C. Cooper
Ellisville, Montana

Putting Multiplan Links Asunder

"Linking Worksheets With Multiplan" [*PCW*, Vol. 2, No. 10] provided excellent insight into one of the more powerful and useful features of *Multiplan*.

However, anyone who intends to delve into complex linkages and who is prone to making mistakes (is anyone out there perfect?) will most certainly face the problem of how to unlink a worksheet that has been "permanently" linked. Therefore, no discussion of linking can be complete without a mention of how to dissolve links.

To dissolve a link, one must proceed through the external Copy menu as if to create a link, entering the supporting sheet name and the name of the cell(s) on that sheet to be unlinked. Then, moving the cursor to the 'to:' field, the user should enter blanks (or simply hit <Del> on the 10-key pad), which is a "null" response and thus deletes the link. How much simpler it would be if the eXternal command had a subcommand called Delete or Dissolve.

So all you *Multiplan* users, take comfort; if you find that a link turns out to be wrong just when you thought you had it all together, you can take it apart.

David L. Edwards
Garland, Texas

No Ethics

Roland M. Brown's letter [(*Letters, PCW*, Vol. 2, No. 10) which places part of the responsibility for software piracy at the manufacturers' door because they haven't provided the end user with "a solid product at a reasonable price and with adequate documentation"] expresses common complaints about a new industry–but I feel he has a limited point of view. Let me give you another one. I work for a company that specializes in providing production services to the software industry. From this vantage point, we watch many software firms research and develop quality programs. In five short years programs have gone from a limited 4K to over 200K. This type of software requires much more than a "junior programmer let loose for a couple of months."

Concurrent with program development is documentation development. Less than five years ago it was common to sell the end user a Zip-Loc bag with one disk and little more than folded line-printer output. Today the kit usually contains more than one disk, plus a tutorial, a reference manual, a quick reference, and templates. Additionally, these materials are designed with the input of end users; [the printed materials] are typeset, are printed on good paper and in color, and include many pictures and screen representations.

Developing, manufacturing, and supporting quality programs is not an inexpensive proposition. Talented people concerned with these products or services deserve to be paid for their efforts. The price paid for a software program is governed largely by these salaries and expenses.

I cannot accept the premise that the software industry is somehow responsible for piracy. An individual's lack of ethical standards is no excuse for piracy–yesterday, today, or tomorrow.

L. Damon Crumb
Bedford, Massachusetts

More Word Wars

The September 1984 issue of *PC World* contained a letter from Anthony V. Pace, Jr., concerning my article "War of the Words." It also contained a response from the Editor. Several issues require further comment.

I am in full agreement with Mr. Pace about the quality of *Word*'s documentation. I wish to make it clear that the version of the program sent to me by the magazine was a beta-test version that was

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supplied without the final documentation. Had I seen this documentation I would certainly have commented on it.

On the other hand, the program itself is a top-quality product. It has become my word processor of choice. I have just completed a book-length manuscript with it, and I found it extremely powerful and easy to use. It's a shame that the current documentation hides these facts from users. My understanding is that Microsoft intends to rectify this situation.

Burton L. Alperson
Contributing Editor, PC World
Los Angeles, California

His and Hers

I believe your magazine is one of the finer personal computer publications available today. Worthy of particular praise is your reference to a nonspecific person in all of your articles as "he or she" as opposed to the all-too-common male pronoun. Since women make up more than half the population of the planet, it seems fitting to include them anywhere it may be appropriate.

Joseph T. Finnivan
North Billerica, Massachusetts

Letters should be mailed to Letters, PC World, *555 De Haro St., San Francisco, CA 94107, or sent electronically to MCI Mail PCWORLD, CompuServe 74055,412, or The Source STE908. We reserve the right to edit letters. Letters should not exceed 300 words.*

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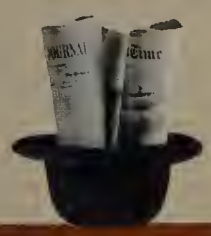
A review of the IBM Personal Computer Family. Vol. 1, No. 2



HARDWARE NEWS

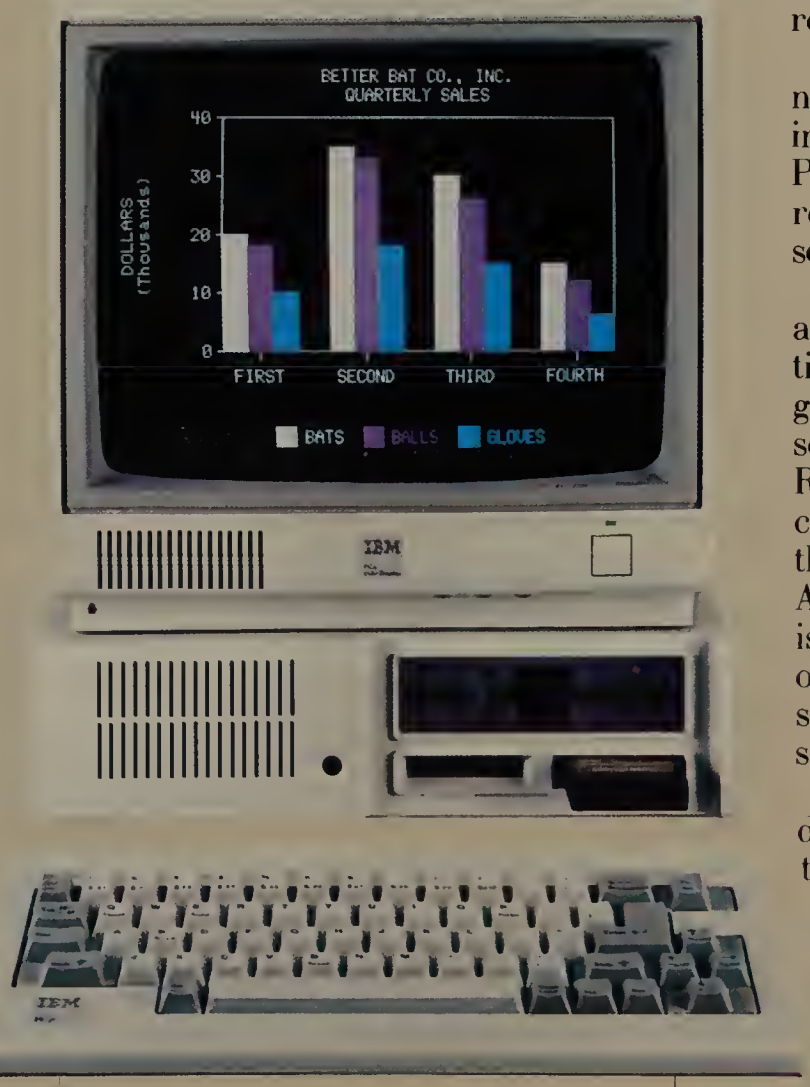
Progress. Even for a youngster with unusual potential, the IBM PC*jr* has made a lot of progress in its first year.

Consider memory for example. The IBM PC*jr* comes with up to 128KB of internal user memory. You can also add external memory expansion units of 128KB each, up to a total of 512KB. That's far more potential memory than other computers of its price range and weight class (10 pounds).*

Increased memory allows you to take full advantage of the IBM PC*jr*'s powerful 16-bit processor. With up to 512KB of available memory and PC*jr*'s double-sided diskette drive, you can run thousands of best-selling programs that have been developed for the IBM PC. If you're a programmer, the PC*jr* joins the other members of the IBM PC Family as a full-fledged application development tool.

There is also a variety of plug-in cartridge programs, which work faster than diskettes and don't take up any user memory. Three popular examples are Lotus 1-2-3™, PC*jr* Color-Paint, and Managing Your Money™ by financial expert Andrew Tobias. And every PC*jr* comes with cassette BASIC built into the system board.

PC*jr* makes it easy and affordable to start small and grow at your own pace. The $599 PC*jr* Entry Model, for example, comes with 64KB of memory, runs cartridge programs, and can easily be expanded into a diskette model. The PC*jr* Enhanced Model at $999** offers 128KB of memory—enough to run many programs from the IBM PC software library—and a 360KB diskette drive.



*Cartridge-based programs for PC*jr* include Lotus 1-2-3™.*

No matter which model you choose, the IBM PC*jr*'s 13 ports for plug-in options make it easy to add to your system, from more memory, to a modem, joysticks (PC*jr* can accommodate two), color monitor, or other peripherals.

Keys and colors. The IBM PC*jr* now comes with a new typewriter-style cordless keyboard that frees you to work up close or across the room from the system unit.

While PC*jr* can be connected to just about any display, including your TV set, the IBM PC*jr* Color Display offers some real advantages at a very reasonable price.

It has a built-in speaker and an earphone jack for educational and entertainment programs that feature music and sound effects. The non-glare RGB screen gives you better character definition and clarity than a color composite monitor. And since the PC*jr* Color Display is designed to be placed on top of the system unit, it's a space-saving addition to your PC*jr* system.

Whatever monitor you decide to add to your PC*jr* system, there's no extra expense for an additional interface card. Ports for both monitors and serial printers are built in.

*Weight does not include power pack and monitor.

**Prices shown apply at IBM Product Centers.

Lotus 1-2-3 is a trademark of Lotus Development Corporation.

Managing Your Money is a trademark of MECA.

UP AND RUNNING

First String. It didn't take the IBM PC*jr* long to make the team. In its first year of eligibility, PC*jr* was picked by coach Grant Teaff to play a key position for the Baylor University football team.

Coach Teaff has a practiced eye for players with potential. He's coached the Baylor Bears to two Southwest Conference championships, been named Southwest Conference Coach of the Year five times, and was National Coach of the Year in 1975.

The Bears' coaching staff has used computers to help analyze scouting reports and playing patterns of opposing teams for nearly ten years. In the beginning, though, there was a lot of competition for a limited amount of computer time.

Coach Teaff and his assistant coaches had to write up all their game and player information and then have it keypunched. After that came a wait for processing time on Baylor University's mainframe computers, time that had to be shared with other departments and the university administration. Analysis of a game often wasn't available until a week after it had been played.

PC*jr* helped change all that.

Winning Tendencies. Coach Teaff calls the IBM PC*jr* "the ideal football coaching tool." With up to 512KB of available memory, it's powerful enough to make his staff independent of the University's central computers. And PC*jr* and the PC*jr* Color Display are inexpensive and compact enough to be used in offensive and defensive staff meeting rooms.

Using software developed by Coach Teaff, PC*jr* enables the Bears' coaches to enter information as they view game film of an opposing team and to see results immediately. When play-by-play statistics of several games are compiled and analyzed on PC*jr*, the coaches are able to identify tendencies of a team in given situations. They're then able to adjust their own game plan accordingly.

When Baylor plays new opponents, for instance, the two teams exchange films of past games. PC*jr* is used to analyze variables such as down, distance, and type of play. The Baylor coaches enter the game with much the same level of knowledge as if they'd played the new team for years.

The IBM PC*jr* helps out with other coaching duties as well. Team statistics, information about possible recruits, and numerous business and financial chores are all part of its workload.

Other coaches around the country had a chance to see the benefits of computerized coaching techniques this summer when members of the Baylor coaching staff demonstrated their programs at the nationwide football and basketball clinics sponsored by The Coaches, Inc.

Coach Teaff points out that a PC*jr* could make the difference between winning and losing to teams—small high schools, for example—with a limited budget and coaching staff. Using the PC*jr*, he says, "is like adding two or three men to the staff."

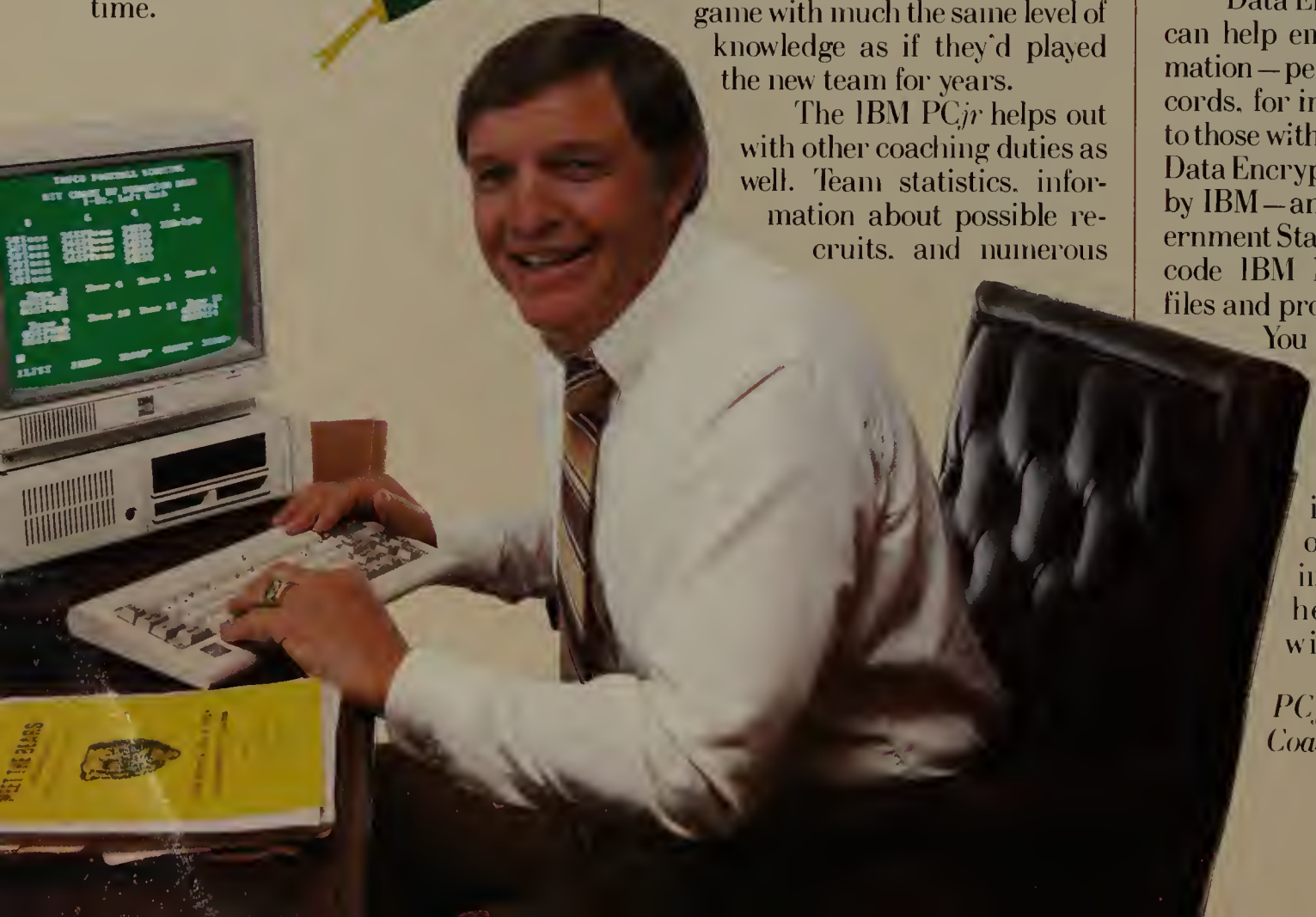
Not bad for a 10-pound, first-year player.

WHAT'S THE PROGRAM?

Maximum Security. Some information belongs under lock and key. But the rapid growth of personal computing and computer networks makes it increasingly difficult to keep it there.

Data Encoder software from IBM can help ensure that sensitive information—personnel and payroll records, for instance—is available only to those with a need to know. It uses the Data Encryption Algorithm developed by IBM—and adopted as a U.S. Government Standard—to encode and decode IBM Personal Computer data files and programs.

You don't have to be a master cryptographer to use Data Encoder. For members of the IBM Personal Computer Family with 192KB of memory, there's a full screen interface with menus and help screens. Systems with 128KB use easy



*PC*jr* is a team player for Coach Grant Teaff.*

DOS-like commands. You designate the key that triggers encoding and decoding procedures.

Files protected by Data Encoder can still be sent through IBM Personal Communications Manager or any other communications program with a text transparency feature. Without Data Encoder software and the proper security key, however, the information remains unintelligible.

So much for prying eyes.

In the clear. While some people are determined to keep things confidential, others want nothing less than perfect clarity. The following new members of IBM's growing family of programming productivity tools can help remove that unwanted element of mystery from your application programs.

The IBM Professional Debug Facility can help make short work of improving your assembler language programs. It includes a Resident Debug Tool for full function, full screen interactive debugging, a Disk Repair Program, and a Non-maskable Interrupt card for access to a system that's locked because of program error.

The IBM Personal Computer Application Display Management System (ADMS) simplifies creation of clear, informative screens for application programs. Since screen development is one of the most time-consuming programming tasks, ADMS can help dramatically increase your application development efficiency and productivity.

ADMS consists of two parts. The Application Display Designer is a screen building program that significantly reduces the program coding required for an application. The Application Display Manager is a runtime program that interprets the screen design code.

Screens defined with ADMS remain independent of the application program, so they can be modified or redefined without affecting the logic of the application.

The view from the top. It's worth noting that programs developed with the help of ADMS can run under TopView, IBM's new multitasking operating environment.

TopView's multitasking capabilities allow you to work quickly and efficiently with a wide range of application programs. You can switch rapidly from one program to another without reloading diskettes and can copy information from one application to another. Sales figures from a spreadsheet program and a document from a word processing program, for example, can be used concurrently to produce a sales report combining financial information and text.

In addition, the TopView operating environment supports advanced windowing facilities, data transfer among different applications, and pointing devices such as a mouse. All are features that enable you to work easily with a variety of applications.

Data Encoder software from IBM.

There's also an IBM TopView Programmer's Toolkit available that contains the routines, utilities, and systems related information necessary to develop applications that run under TopView.

FUN AND GAMES

Medieval adventures. The ideal game is easier to define than to find: it should be entertaining *and* enlightening. There are new programs from IBM that manage wonderfully to be both.

King's Quest from IBM, for example, is chiefly for fun but does impart a few important lessons. The hero of this colorful three-dimensional adventure game, the valiant Sir Grahame, is sent by the King of Daven-try to search the countryside for three magical items that will prevent the

King's Quest software from IBM.

kingdom's collapse. Along the way, he encounters dangerous creatures, makes new friends, and avoids—or tries to avoid—treacherous terrain.

King's Quest is unusually enjoyable because you interactively control Sir Grahame's wanderings, helping him duck, jump, or swim his way through the quest. Many tasks can be solved in different ways, and more creative solutions are awarded higher scores.

Hence also the educational value. Cleverness and imagination are rewarded. And a few valuable practical lessons are reinforced along the way. Looking, for instance, before one leaps into alligator-filled moats and deep, dark holes.

King's Quest runs on the IBM PC*jr* and makes good use of some special PC*jr* capabilities. Sir Grahame's movements, for example, are unusually smooth and realistic because multiple video buffers in main memory are used instead of a single chip to create the animation effects. PC*jr*'s three voice sound creates an impressive variety of sound effects, such as a fanfare of horns when the castle door opens. And PC*jr*'s ability to produce 16 colors lends a touch of realism to an imaginary kingdom.

Modern machines. But can a program with more serious didactic intent be as enticing as Sir Grahame's rough and tumble lessons? Yes, if it's Rocky's Boots™, winner of *Learning* magazine's Software of the Year award and of high praise from *The New York Times*.

In fact, Rocky's Boots from IBM is also a quest for creative solutions to a series of different games. Along the way, both children and adults can learn the basics of electronic circuitry and of the Boolean logic that drives computer operations.

Lest that sound too intimidating, remember that the learning is a by-product of games in which you build various simulated machines on your display screen. Early sections of Rocky's Boots guide you through basic instructions about building and activating simple electronic devices.

You're also introduced to the various "spare parts" and "tools"—such as clackers, boppers, alligators, and alligator detectors—that may come in handy. Later in the program there are more challenging games to play using the machines you've built.

All in all, Rocky's Boots is as thoroughly engrossing as King's Quest. And on one point, at least, it's easier: Sir Grahame has to make do without an alligator detector.

Christmas cheer. Rocky's Boots and King's Quest are part of a special Christmas collection of entertainment and educational software from IBM.

Some others in the Christmas collection come from the same series of IBM learning games as Rocky's Boots. They include Bumble Games™, Bumble Plot™, Gertrude's Puzzles™, Gertrude's Secrets™, and Juggles' Butterfly™. See your authorized IBM Personal Computer dealer, IBM Software dealer, or IBM Product Center for complete details.

The Learning Company reserves all rights in the Juggles, Bumble, Gertrude, and Rocky characters and their names as a trademark and under copyright law.
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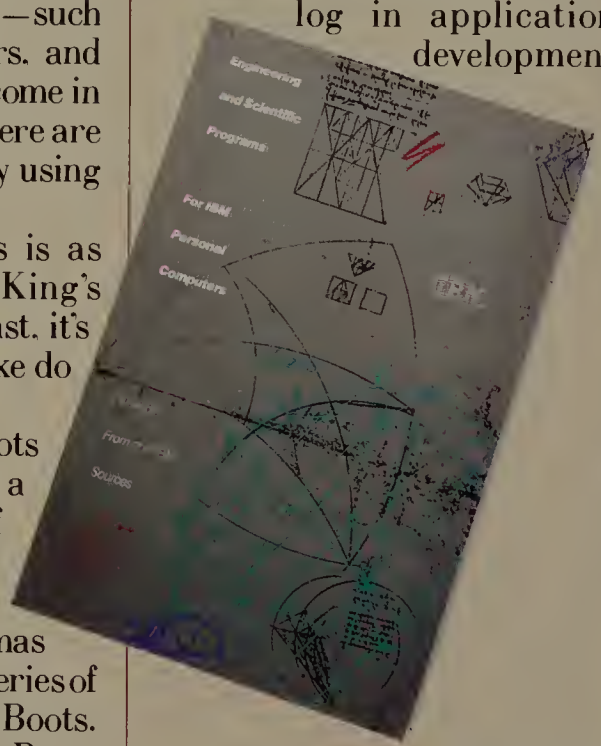
HARDCOPY

Full Disclosure. If business applications or entertainment programs aren't what you're after, there's a new software listing available from IBM, one with a long title but a specific purpose: the directory of *Engineering and Scientific Programs for IBM Personal Computers Available from Non-IBM Sources.**

It lists programs in a wide variety of engineering/scientific categories, from Computer Graphics to Lab Automation and Statistical Techniques. The *Engineering and Scientific* directory includes program descriptions, minimum configuration requirements, initial availability dates, and vendor information.

If your department or laboratory is suffering a backlog in application development work, one of these programs—in original form or with a little modification—may be the answer.



Directory of engineering and scientific programs for IBM Personal Computers.

For information about where to get the IBM *Engineering and Scientific* directory, see the box at the end of this issue of *Read Only*.

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TIPS AND TECHNIQUES

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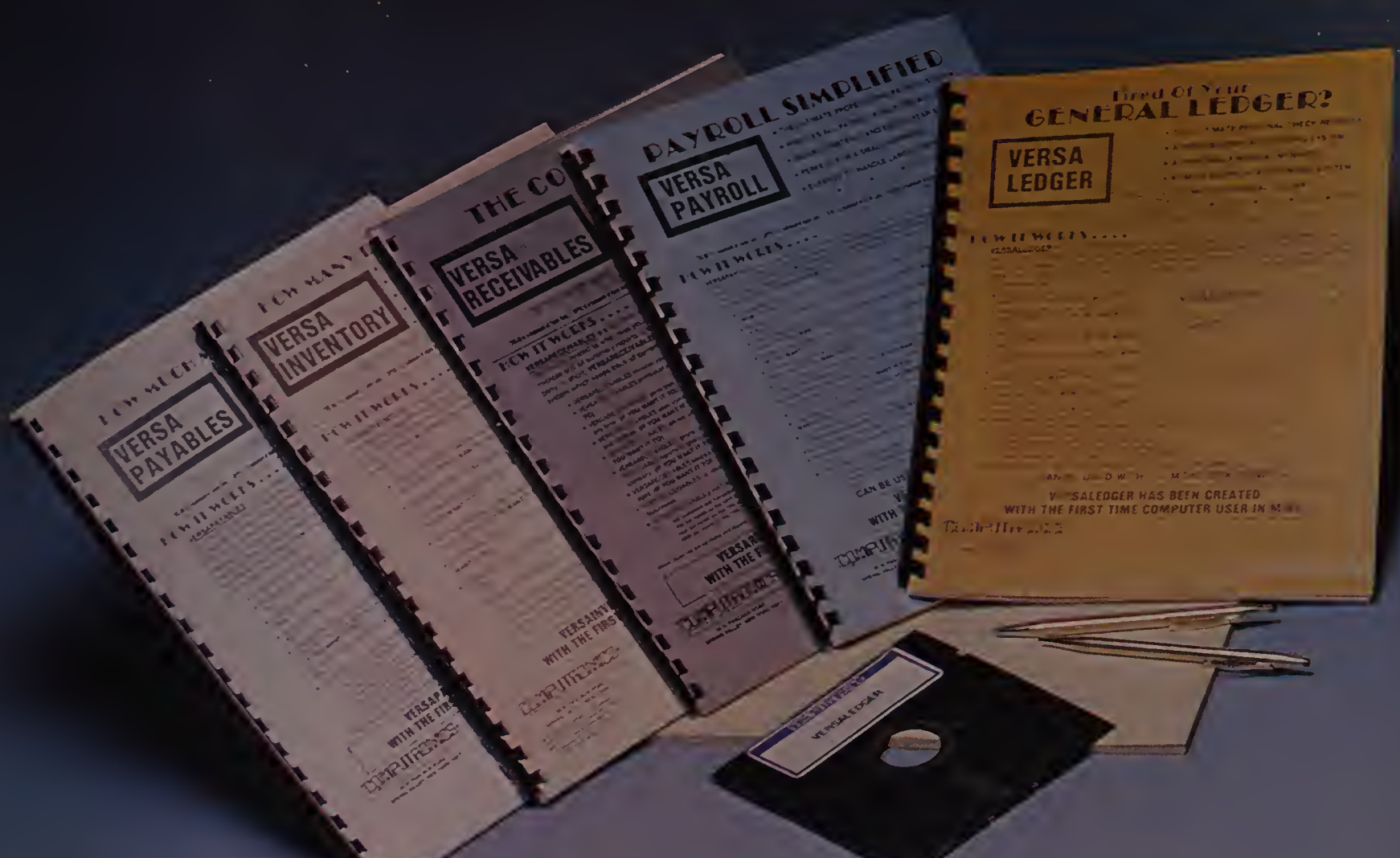

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Garry Ray, **PC WEEK**, *July 24, 1984*

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Here's Sidekick in action. That's Lotus 1-2-3 running underneath. In the Sidekick Notepad you can see data that's been imported from the Lotus screen. On the upper right, that's the Sidekick Calculator.

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PC WORLD

Reserving the Function Keys

One man's uphill fight on behalf of the visually impaired

Seven years ago a rare eye disease took Ron Hutchinson's sight. Hutchinson soon discovered that hardware and software designed for the blind was inadequate for his needs and too expensive, so he started writing his own programs. His current program for the IBM PC, *The Enchanced PC Talking Program,* works with most voice synthesizers to turn the PC into a functional talking computer. The program, which runs with popular programs such as *1-2-3, WordStar,* and *Multiplan,* has options for spelled speech, total speech, identification of uppercase and lowercase letters, and the reading or spelling of an entire page.

Ron Hutchinson at his computer.

PC World View *reports new developments in computer technology, items of interest to computer enthusiasts, and the most significant and enticing speculation about industry trends and personalities. We've reserved the "Grapevine" section of this column for industry reports that are still at the speculative stage.*
–Katie Seger

View

News and notes for the computing community

While converting his program for the PC (his first versions were for Radio Shack computers), Hutchinson discovered that certain key combinations–particularly the <Alt> key combined with one of the ten function keys–are very easy for blind people to find on the IBM keyboard. So Hutchinson began a one-man campaign. "I've made hundreds of dollars worth of phone calls and written many letters to software manufacturers in an attempt to get them to reserve a standard set of keys for blind users."

Despite repeated phone calls to companies like Microsoft and IBM, Hutchinson has had "little or no luck," he said. "It seems that nobody wants to make a decision that might upset corporate planning." Hutchinson noted that small companies like Quicksoft have been very supportive, but large software firms have apparently ignored the issue.

"Through the computer, the visually impaired have more access to jobs than ever before," Hutchinson said. He vowed to continue his fight for a new standard. He asked that people who support his idea write to large software firms and urge the companies to adopt the standard.

Grapevine

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Hard Driving Times

In August of this year (*PCW*, Vol. 2, No. 9) *World View* wrote that IBM had diminished orders for 10MB hard disks from Seagate Technology, MiniScribe, and International Memories. We reported that IBM would continue to purchase units from Seagate, but other hard disks would be supplied by IBM Japan and an IBM manufacturing unit in Rochester, Minnesota.

Industry watchers did not think that the IBM purchase reduction would greatly hurt Seagate, but the Scotts Valley, California, firm apparently is weathering the marketplace storms even better than expected. According to an industry source, Seagate has been chosen as a second source supplier of 10MB hard disks for the AT&T PC 6300.

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Two Equals One?

IBM units in both Arizona and Vermont are working on 3½-inch floppy disk drives, according to industry sources. Why would IBM have two R and D units working on the same product? One explanation is that one unit is doing the research while the other is manufacturing disk drive prototypes. The units' efforts will presumably be realized in IBM's long-rumored lap-size computer.

One Bad Apple

The IBM public relations people must have been wincing the day of the PCjr expansion announcement. Big Blue also unveiled several educational programs–including the Writing to Read system–for its personal computer family, and the company brought in some children who had participated in Writing to Read pilot programs to demonstrate the software.

New York Times reporter Stuart Diamond wrote that a 6-year-old participant, Melinda Gardner, from Burlington, North Carolina, said that her parents have promised her a computer for Christmas. The make? "I want an Apple," she said.

A New Low in Software

(Former *PC World View* Editor Miriam Medom recently surfaced with this opinion of a new development in the software business.)

The programs aren't too awful, but the hype and the concept behind a new line of software has gone too far. The company responsible: Neon Software, of Middletown, Connecticut. The product: *Women's Ware.*

This series of programs has all the clichés—an electronic checkbook, a budget, a calendar, and, yes, a recipe file. But wait! Coming soon from the folks at Neon will be *Home Decorator, Diet/Nutrition Planner,* and *Beauty/Fashion Designer.* Never mind how a computer can teach you to dress or apply makeup, the point is that this software is for you, the women of America. One wonders if Neon's next product line will be *Ethnic Ware!*

As if these programs weren't sufficiently embarrassing, Neon has chosen to package *Women's Ware* like pantyhose—suspended from a pint-size coathanger (see photo). In this woman's opinion, at least, the notion that women need separate, condescending, hand-holding software is an insult to sensible computer users of both sexes. Neon, hang it up.

Neon Software's questionable packaging for Women's Ware.

Mail-Order Disks

If anybody doubts the permanence of personal computers, it is not the Book-of-the-Month Club. The mail-order club issued its first *BOMC Guide: Best Computer Books & Software* this summer. The 20-page guide features a wide variety of computer and programming books and several word processing, home, and game software packages. BOMC plans to issue the guide quarterly.

Down on the Computerized Farm

The Eastern Computing Farmers Association (ECFA) has been established for farmers who use or are planning to use a personal computer for their farm operation. The association provides members with free agricultural computer consultation by phone, maintains an extensive agricultural software library, and offers group discounts on computer supplies. ECFA also publishes a monthly newsletter, *Eastern Computing Farmer,* for members.

Association membership is $35 annually. For membership information write to ECFA, P.O. Box 336, State College, PA 16804.

Stamp of Approval

Correspondent and philatelist Raymond Schuessler wrote to say that the proliferation of computer systems is being matched by the release of postage stamps. "It isn't often that a new topic springs upon the stamp scene, and this one is already growing by leaps and bounds," he said.

According to Schuessler, the first stamp showing a computer was issued by Israel 20 years ago; since then more than 200 stamps celebrating computers, electronics, and telecommunications have been issued worldwide. Stamps honoring scientists and mathematicians, such as Blaise Pascal, Joseph Marie Jacquard, and Albert Einstein, are also popular additions to the thematic collection of computer stamps, he said.

Schuessler noted that computer enthusiasts who become stamp enthusiasts have an advantage over old-fashioned philatelists—the hackers can organize and keep track of their collections with their computers.

A 1962 French stamp honoring philosopher and mathematician Blaise Pascal and a United States stamp issued in 1973.

Computer Reservations

The Society for Information Management (SIM) is asking companies to donate new and used microcomputers to its Computer Education Project. The project's goal is to place computers in Native American schools at reservations throughout the country. The organization hopes to have pilot programs at two reservations by the end of December. In addition to hardware, SIM is accepting software, training materials, and cash contributions.

SIM is a nonprofit organization made up of data processing and computer executives who work for large companies. Donations should be sent, postage paid, to SIM, 111 E. Wacker Dr., Chicago, IL 60611.

Social Study

Computer networks aren't always electronic. Many formal and informal social networks have grown up alongside the personal computer boom. A two-year study, funded by a National Science Foundation grant, began in August to study the social interaction among personal computer buyers and users. Researchers at The Graduate School and University Center of the City University of New York are conducting the study under the direction of sociology professor Dr. Charles Kadushin.

The study will examine the kinds of problems computer buyers and users encounter and how users help one another to solve problems. "It has been said that computers are isolating and alienating," Kadushin remarked, but he thinks that user groups, electronic mail systems, and bulletin boards prove the opposite is true. "The darker side of all this interaction is the illegal copying of software that is protected by copyright," he said.

Kadushin thinks that the findings of the study will help hardware and software manufacturers develop and market products that will match consumer desires.

Different Peripherals

Hoping to cash in on the computer market, some enterprising folks are busy marketing a variety of "peripheral" products that may find their way into a few Christmas stockings.

The people at Zick Productions are selling the manual *Computer Gardening Made Simple,* by Charlie DeJardin. The manual promises "to put computers back in the garden next to the tomatoes and peas." The book comes with two integrated circuit chips–"computer seeds"–that will sprout into calculators and then into full-grown computers if suspended in jars of fresh water. To order, send a check for $3.75 to Zick Productions, c/o Triad Publishing Co., 1110 N.W. 8th Ave., Gainesville, FL 32601.

Chocolatek, a San Diego company, has designed a computer board that weighs 54 grams, is ¼-inch thick, and measures 4 inches by 2½ inches. The Chocolate Chip is made out of Belgian chocolate and manufactured at Hooper's Candies in Oakland, California.

The chocolate board is the brainchild of two San Diego artists, A. Wasil and Bob Kerstetter. The two men have formed a partnership with San Diego businessman and lawyer Si Coleman. Chocolatek's first batch of 10,000 Chips was shipped in early July. The Chips are packed in shiny gift boxes and will sell for $6 to $8.

PC World View *welcomes contributions from readers, and we'll pay up to $50 for the items we use. Please include your name, address, and phone number with your contributions; send them to* PC World View, PC World, *555 De Haro St., San Francisco, CA 94107.* ●

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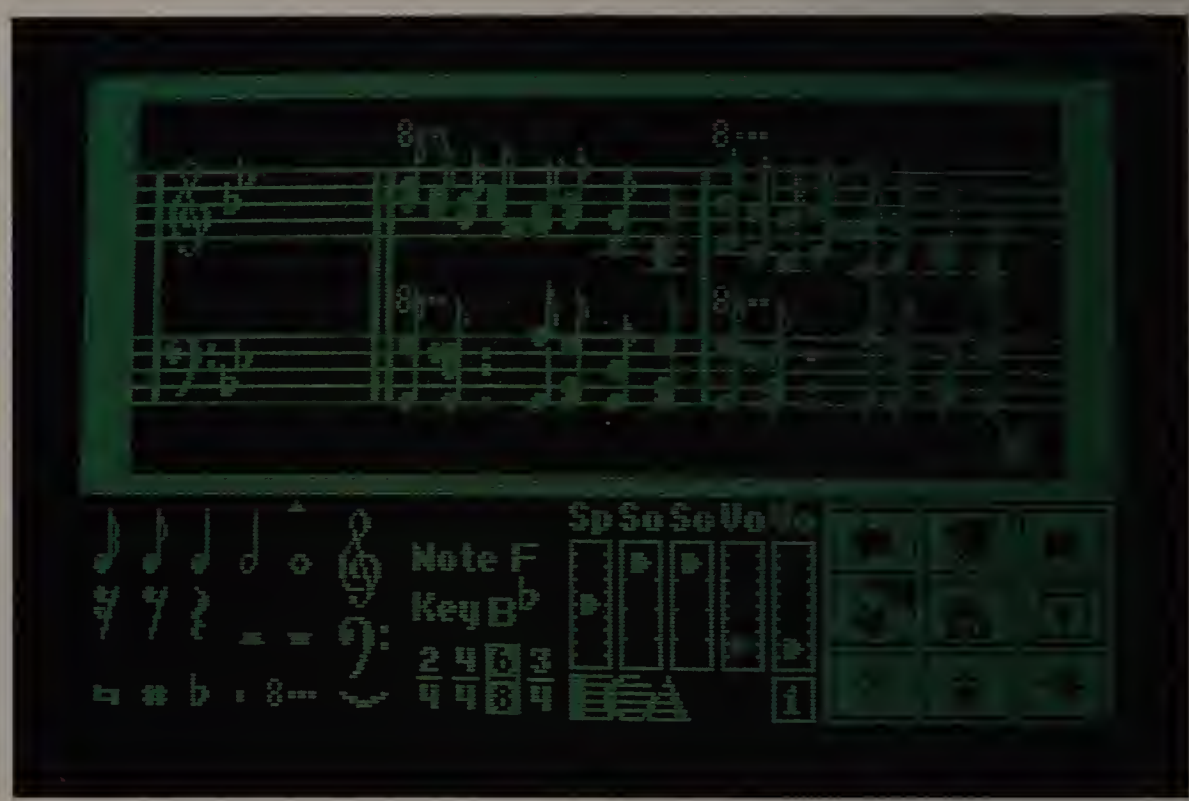

LET'S FACE IT. Up till now, music programs for your home computer have all sounded, well, pretty lame. There were the ones that resembled little electronic music boxes, remember? And then there were those that sounded like so many burps.

Enter Music Construction Set.™ It's the first music program that really makes use of the power of that machine you've got. If you're a serious student, this means you'll be able to work with an intricacy and range of sound quality you've never heard before on a computer. And if you know nothing about music, you'll find something even more important. Namely, that this thing is simple enough to be a lot of fun.

Take a good look at this screen because it, you, and a joystick are the whole story here.

That's you at the right end of the staff of notes — the little hand. Move the joystick, and you move the hand. Use it to carry notes up to the staff. Lay in rests, signatures, clefs, then point to the little piano in the lower right and listen, because you'll hear the whole thing played back.

Move those little scales in the middle up and down to vary the music's speed, sound quality, and volume. Use the scissors to cut out whole measures, then use the glue pot to paste them in somewhere else. Got a printer? Great. Print the score out and show it off to your friends.

But what if you're not up to writing your own stuff yet? No problem. There are twelve pieces of music already in here, from rock 'n roll to baroque. They're fun to listen to, and even more fun to change. (Apologies to Mozart.)

The point is, the possibilities are endless. But if you're still skeptical, visit your nearest Electronic Arts dealer and do the one thing guaranteed to send you home with a Music Construction Set in tow.

Boot one up. Point to the piano. And listen.

MUSIC CONSTRUCTION SET

from ELECTRONIC ARTS.™

MUSIC CONSTRUCTION SET is now available for Apple II, II+, IIe and IIc, IBM-PC and PCjr, Atari and Commodore 64 computers. The Apple IIc and Atari versions play chords of up to four notes each. The PCjr and Commodore play chords of up to three notes each. Music Construction Set is a registered trademark of Electronic Arts. Apple is a registered trademark of Apple Computer Corp. Commodore is a registered trademark of Commodore Business Machines, Inc. Atari is a trademark of Atari Computer Corp. IBM-PC and PCjr are trademarks of International Business Machines, Inc For a free product catalogue, send a stamped, self-addressed #10 envelope to Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403.

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Until now, if you wanted database software that was easy to use, you had to settle for PFS.

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C·I·P also gives you the power of date arithmetic for real business needs such as agings, schedules and tickler files. You can't count on PFS for that.

Plus, with C·I·P all fields can be "keyed" for faster access and reporting. With PFS, your choice of "key" fields is limited to just one.

So why settle for PFS? Especially when there's so much more to see with C·I·P.

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Circle 658 on reader service card

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C·I·P

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Using easy-to-understand menus and keyboard icons, you can see your way to doing most anything. Managing customer files, tracking sales leads, scheduling inventory. And all in the blink of an eye.

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Concentric Data Systems, Inc., 18 Lyman Street, Westboro, MA 01581 PCW 12

The right network isn't a matter of choice. It's a matter of fact.

Fact: You can't buy smarter than an OMNINET™ Network.

Whether you have 2 microcomputers or 200, you bought them to handle information. If each micro has to handle it separately, both your equipment and your people are working inefficiently.

Because they could network with OMNINET. Sharing information—as well as the printing and data storage equipment that really puts information to work.

Add CORVUS' SNA Gateway, and you can link your entire network directly to your mainframe.

The price? At under $500 per hookup, OMNINET is the most cost-effective network you can install. Or expand.

Fact: This network was designed for microcomputers.

Micros get moved. Businesses expand.

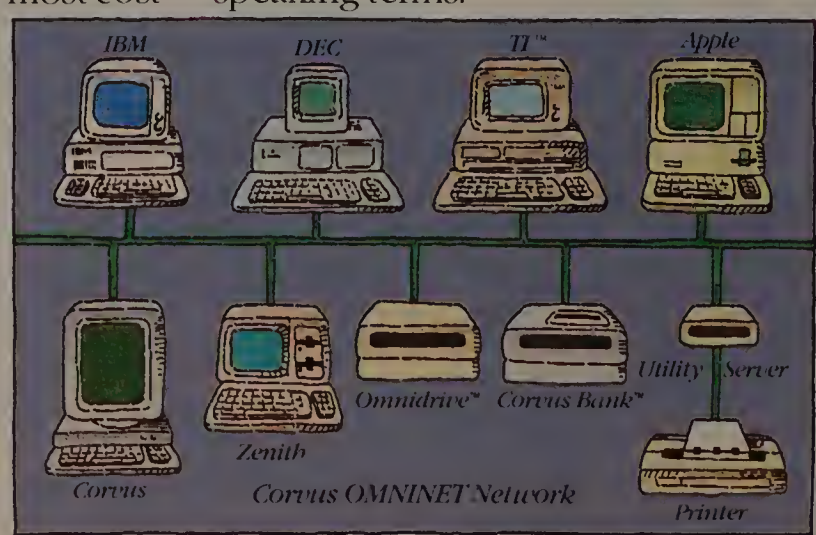
Your network should be able to grow and change just as fast as your business does.

That's why an OMNINET Network uses simple, telephone-type line. Even relocating the system to a whole new building is just a move. Instead of a construction project.

Fact: OMNINET Networks offer unmatched compatibility.

From Apples to Zeniths, OMNINET handles more varieties of computers than any other network.

So keep the DEC's in Data Processing and the PC's in Purchasing. OMNINET will keep them all on speaking terms.



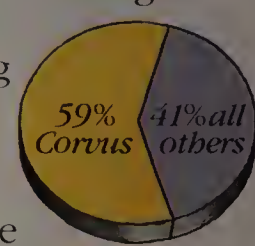
Fact: The experts network with OMNINET.

Over 30 of the major computer companies have licensed OMNINET for networking their micros. So you don't have to worry about support tomorrow for the system you pick today.

And OMNINET already has the most software options around—over 500 programs to choose from, according to your people's needs. Not their network's limitations.

Fact: The facts have made us #1.

CORVUS pioneered local area networking for microcomputers, and we've never stopped working on ways to improve it.



Just give us a ring at **800-4-CORVUS** to find out more.

Because while calling ourselves the best is a matter of opinion, telling you that 3 out of every 5 locally networked micros work on a CORVUS network is something else.*

It's a matter of fact.

CORVUS
The Networking Company.

*59% of all locally-networked micros operate in a CORVUS network, according to *InfoCorp.* CORVUS, THE NETWORKING COMPANY, OMNINET, OMNIDRIVE and CORVUS BANK are trademarks of CORVUS SYSTEMS, INC. IBM PC is a trademark of International Business Machines. APPLE is a trademark of APPLE COMPUTER INC. DEC is a trademark of DIGITAL EQUIPMENT CORPORATION. Zenith is a trademark of Zenith Corporation.

Circle 49 on reader service card

Two very important reasons for using an amber monitor.

Amberchrome™. The "easy viewing" amber monitor from Quadram.

Working in front of a PC can be tough on your eyes. But now you can get your work done without giving your eyes a workout. With Amberchrome, the "comfortable" monochrome monitor from Quadram.

Amberchrome combines a soft amber-tone display with sharply focused characters for a no-smearing, no-ghosting, state-of-the-art screen image that's easy on the eyes. Amberchrome lets you spend more time at the computer, reducing irritating eye strain caused by other monitors.

Amberchrome. More than just a sight for sore eyes.
Amberchrome gives you more than just easy viewing. Like a 12" high resolution (720 × 350) screen image that's perfect for any data processing task. Word processing to complex business graphics. Plus Amberchrome features a special dark glass, anti-glare tube; full IBM compatibility; and low power, stay-cool operation.

The Comfortable Choice in personal computer displays.
All this adds up to one lesson that's easy to learn. Visit your local authorized Quadram dealer today and ask to see Amberchrome in action. One look and you'll agree: Amberchrome is the comfortable choice in personal computer displays.

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Look for this seal. It's your assurance that you're buying the best in personal computer enhancements.

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Circle 149 on reader service card.

HOW TO RULE

ADMIT IT. You've always wanted control. It was there in your daydreams as you drove to work. The ones in which there's a subtle change in your boss's tone of voice. Your office begins a steady march toward the corner. And suddenly, you're C.E.O. with six phones and the world at your feet.

What was it that kept getting between you and that goal?

We suggest you were disorganized. No more than most, to be sure. But then, things did sometimes get lost, confused, forgotten.

You can't rule the world *that* way.

A TINY AD FOR PEOPLE WHO LIKE FACTS AND FIGURES.

Machine requirements:

IBM-PC, XT, COMPAQ, or other 100% IBM compatible personal computers with 256K min. RAM and 1 double-sided disk drive. Color or monochrome display.

Performance data

2 keystroke mail merge. 1 keystroke express between all applications. Cut & paste between all applications. Word processor features include bold face, underline, headers & footers, print preview, quick-set margins, full justification, visible page breaks, templates and much more. Less than ½ sec. to perform all word processor editing functions. Accepts ASCII files from other popular software. Window locations, sizes and colors customizable by user. One key auto phone dialing.

WE CAN FIX THIS.

We have a personal computer program called *Get Organized!* It will organize your life. Quickly and painlessly.

To be exact, *Get Organized!* is 7 different business programs integrated on one floppy disk. It puts everything most managers keep on their desks into your computer. And it does this in such an organized, instinctively easy-to-use way that you'll be using it and benefiting from its power and precision as little as ½ hour after paying for it.

Sound interesting?

A COMPETITIVE ANALYSIS.

Compared with *Symphony* and *Framework*, the price of *Get Organized!* is dramatically low—almost $500 lower on a straight list-price to list-price comparison. And *Get Organized!* will run on far less expensive machine configurations. In fact, what you'll save on disk drives and memory alone could pay for a decent printer.

Perhaps the best way to summarize the significance and value of *Get Organized!* is by telling you the following story:

When we exposed IBM-PC owners to *Get Organized!* in secret marketing tests this summer, a good number of them offered to pay us 5 times the list-price for an advance copy.

What do you think *they* had in mind?

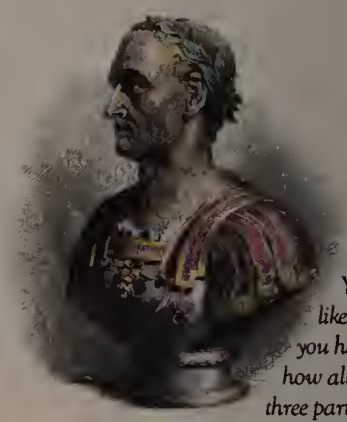
THE $4.99 TRIAL OFFER.

If some of you feel that the claims we've made for *Get Organized!* sound too good to be true, we have a cure.

Call us. Our number is (800) 227-6703. (In California call (800) 632-7979.) Give us your VISA or MasterCard number. For a $4.99 handling fee, refundable upon purchase of *Get Organized!*, we'll speed a demonstration copy your way (on Verbatim disks, no less). At which point your skepticism will go the way of the morning dew.

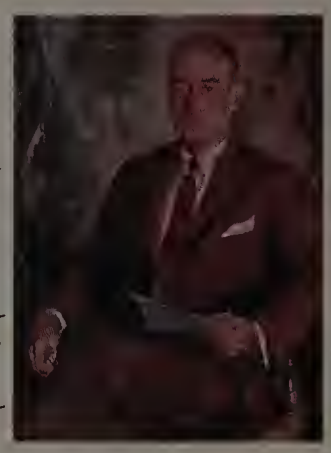
Now then. Armed with your own copy of this remarkable value in business software, go forth, think straight, and you will surely rule whatever it is you wish to rule.

If not, you have hereby lost one of your best excuses.



1 A Full-Featured Word Processor.

You're Julius Caesar. You'd like to rule the world, but first you have to write a book about how all of Gaul is divided into three parts and so forth. You do not have Get Organized! Your writing becomes slow, mistake-ridden and arduous. The Senate becomes impatient. You know the rest.



2 The Address & Telephone File.

If you were Adlai Stevenson and you had Get Organized! you'd have compiled a mailing list of wealthy and influential supporters. Merging this with the Word Processor would have given you a hard-hitting, personalized direct mail campaign. Your budget would have ambushed Ike. And, with the Russians oblivious of the ambitions lurking beneath your liberal exterior, you could have plucked the world like a ripe plum.

3 The Handy Notepad.

You're Napoleon. You're in the study when your wife Josephine comes in and tells you, "Ze pipes are broken and zere is water in ze loo." "Ah weel feex that thing," you tell her, but since you don't have Get Organized!, you scribble down a note to yourself on the nearest paper which, unfortunately, turns out to be the Order of the Day. Nine hours later your army is clobbered in a Belgian village you never heard of.

GET ORGANIZED!™

The personal work manager from ELECTRONIC ARTS™

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THE WORLD for $199.

4 The Calendar And Appointments Book.

You're Hannibal. You have this idea of taking elephants over the Alps to conquer Rome, but being from Carthage, you're a little fuzzy on dates and seasons in Europe. If you had Get Organized! you'd have known better, been able to plan for recurring events (like winter) and won the day. It would have been right there on the screen: "January 1 . . . Invade Rome, Rule World."

5 The TeleComm Package.

You're Queen Victoria. An excited young man arrives with Get Organized! and a curious metal box. He claims they will instantly connect you with the Empire by means of something called "electronic mail" and "a terminal emulator." He promises wealth and knowledge through "The Source," "Dow Jones," "CompuServe," "MCI," and "MCI Mail." His name is H.G. Wells. You decide he is quite mad and dismiss him. A century later, you're lucky to still have the Falkland Islands.

6 The Index Card File.

You're Joan of Arc. You're on a roll, but certain people are threatening to make things too hot for you. Get Organized! would've let you keep up-to-date info on your friends and foes. Like resumes, statistics, or even birthdays. Who knows? The right birthday card to the right Inquisitor at the right time could have made all the difference.

7 The Calculator.

Imagine how useful this would have been if you were John Maynard Keynes. Simple arithmetic would have revealed the terrible flaw in your economic theory. Governments the world over would not be printing worthless money to cover their debts. And this program would be a lot cheaper.

ource is a trademark of Source Telecomputing Inc Symphony is a trademark of Lotus Development Corp Framework is a trademark of Aston-Tate, Inc $199 is the suggested retail price for Get Organized! Prices may vary

Circle 840 on reader service card

CompuServe Means Business

Gaining access to CompuServe's new family of business data bases can be a snap with The Professional Connection.

Kirk Bottomly

Imagine possessing a volume that, when opened, could become any book, newspaper, or journal in your city's business library. The PC by itself doesn't have that kind of magical ability, but it can use phone lines to connect to a mainframe computer that does.

With a simple link to a commercial information utility, a PC can function as an electronic window on the encyclopedic data bases of a mainframe. Currently, one of the most popular of these information utilities is CompuServe, which has recently packaged an impressive array of business and financial data bases for managers. The service is called the Executive Information Service (EIS), and CompuServe has made it easy to access with a program called *The Professional Connection.*

Information for Business

Since 1979 CompuServe has been offering the Consumer Information Service (CIS), a portfolio of services that includes electronic mail, access to national news wires, electronic magazines from *Popular Science* to *Business and Law Review*, a national electronic bulletin board, IRS taxpayer information pub-

lications, interactive games such as *Adventure* and *MegaWars,* and an on-line encyclopedia. To build on its subscriber base of 100,000 (more than twice that of its nearest competitor), CompuServe introduced the Executive Information Service, a network information service that works in much the same way as the CIS, its consumer counterpart, but is geared to the information needs of the business professional.

The EIS consists of a vast electronic business library that includes Standard and Poor's, National Business Wire, Moody's, Dow Jones, a daily commodities report, several dozen other financial information services, as well as the news services of the Associated Press and the *Washington Post.* A decision-support module puts a set of sophisticated demographic and statistical analysis tools in managers' hands. Weather, airline, travel, and shopping information are also available. In addition, CompuServe throws in its Consumer Information Service as part of the EIS package.

Making the Connection

Any basic communications program, such as *Crosstalk* or *Smartcom,* can connect you to the EIS, but users of such software already know how to access network services. To capture a larger share of the business market that includes those potential users who have little or no familiarity with communications programs, CompuServe designed *The Professional Connection.* Augmented by DOS 2.00 and a modem, the software enables you to connect a PC to CompuServe's network and access any of its data bases—but it also does much more.

As an entry point to CompuServe's EIS, *The Professional Connection* is a powerful communications program that offers simplicity without sacrificing flexibility.

By purchasing the package, you effectively become a CompuServe subscriber. Calling a customer service number listed in the kit gets you a user ID and a password. Charges for hourly connect time vary from $6 for evenings and weekends to $12.50 for weekday business hours. Accessing many of the data bases (such as the *Washington Post* and the Official Airline Guide) costs extra.

The Professional Connection comes in a small white binder and consists of two disks and a 50-page manual. The documentation summarizes the procedures necessary to hook a PC and modem to the EIS mainframe in Columbus, Ohio, and thoroughly explains how to use the software to navigate data bases and perform basic functions (such as printing or storing information in a separate disk file that will enable you to view or print later). Documentation also includes manuals for both the EIS and CIS that explain all of the data bases and any special procedures. An alphabetical list of data bases and services accessible on the EIS runs nearly 15 pages.

> The Professional Connection *is a powerful communications program that builds in simplicity without sacrificing flexibility.*

When you first run *The Professional Connection,* you are automatically prompted for some basic information—the type of modem, its data transmission speed in bits per second (bps), the local phone number for access to CompuServe, your user ID, and your password. Once you have specified these fields, the program dials up and automatically logs on to the EIS network. (CompuServe can also be accessed through the Tymnet, Telenet, and Canadian DialPac networks.)

Indexes and information from data bases are presented on screen-size "pages." As you read along, information scrolls onto the screen one page at a time. As with any nonelectronic reference book, you can flip readily to any other section (by typing a page number or a section title), return to the table of contents (the main menu), or simply "turn the page" (by hitting the <Enter> key). You can quickly learn to move from one information service to another and to locate precisely those parts of a data base that you want. You can even automate access to the data bases you use most often. *The Professional Connection* makes use of the PC's <Alt> and function keys to turn the printer on or off, switch to earlier menus, capture data to a buffer, and so on.

Moderns, Anyone?

In San Francisco, local public television station, KQED-TV, was holding its annual on-the-air fund-raising auction. Always a popular affair in the Bay Area, the auction inspires generous donations from the community. There is the usual spate of theater, opera, and baseball tickets. A wealthy friend of the station was putting her Mercedes on the block. Countless sauna and massage offerings were up for bid, as well as a spectacular series of six signed Ansel Adams prints. Viewers, in turn, bid generously. What price, after all, can one put on a television week blessed by Louis Rukeyser, Alistair Cooke, and Kermit the Frog?

There, tucked between a set of whitewall tires and an ivory and opal Playboy bunny pendant were *The Professional Connection* and the Executive Information Service, CompuServe's latest offering. "The most accurate, comprehensive package of financial data, current news, decision-support research, and communications options currently available," went the pitch. None of this was very clear, however, as the auctioneers read capsule summaries of the product.

"This program requires an IBM PC," said the announcer, squinting to read a handwritten note, "with DOS 2.00 and a modern." Modern? He gave the note a quizzical look and turned for verification to his on-screen colleague, who looked hard at the card and nodded reassuringly. "DOS 2.00 and a modern," he affirmed.

Yes, public television, otherwise known for its literate programming, is afflicted with computer illiteracy. (Modems may be modern, but the connection ends there.)

The confusion was unfortunate for the businesspeople in the viewing audience: CompuServe is pitching its product precisely at business executives who lack computer experience. KQED's two perplexed auctioneers did little to enlighten that group.

CompuServe's San Francisco office had donated four such packages to the auction. None of them attracted very enthusiastic bidding, and all went for less than half of their $139 value. This is difficult to understand, since anyone offering $140 also received a box of chocolates. You can usually sell anything if you add chocolate to it.

```
                                CompuServe

                                Main Menu

1-CEIS Main Menu   11-Stocks (no log)   21-Directory A:   31-
2-InfoPlex         12-Mail (no log)     22-Directory B:   32-
3-Ticker Retrieve  13-                  23-               33-
4-Quick Quotes     14-                  24-               34-
5-Airline Guide    15-                  25-               35-
6-Comp-U-Store     16-                  26-               36-Reserved
7-Weather          17-                  27-               37-Terminal Mode
8-IBM Forum        18-                  28-               38-Help
9-AP Viewdata      19-                  29-               39-Maintenance
10-                20-                  30-               40-DOS Command

                                        Use ARROW KEYS to select

Execute   Add   Delete   List           Press ENTER to EXECUTE the
                                        selected entry

Enter selection:
```

Figure 1: The Professional Connection main menu serves as the starting line from which you can run remote job scripts.

```
CompuServe            Page EIS-1

EXECUTIVE INFORMATION SERVICE

1 Communications                  6 Shopping
2 Investments & Quotations        7 Weather
3 Decision Support                8 Professional & Technical
4 News                            9 Consumer Information Service
5 Travel                         10 User Information


Enter your selection number,
or H for more information.
```

Figure 2: The Executive Information Service main menu acts as a table of contents for CompuServe's battery of business data bases.

```
LOGIN              !Automatically logs into the service
MATCH "!"          !Wait for this prompt
SEND "go twp"      !Go to the Washington Post
MATCH "!"          !Wait for this prompt again
SEND "8"           !8 is the menu number for World & U.S. News
SEND "1"           !Display story £1
```

Figure 3: This sample Professional Connection script accesses the Washington Post in a few simple steps.

Write Your Own Scripts

The real power of *The Professional Connection* lies in its ability to execute a series of routines automatically–logging on, accessing one or more data bases, printing or storing the desired information, and logging off–with a keystroke or two.

Imagine arriving at your office in the morning, flipping on the PC, loading a program, and by pressing a single key, initiating a routine that automatically

- Logs on to CompuServe;
- Prints the lead stories of today's *Washington Post;*
- Pulls all the messages from your electronic mailbox, prints them, and saves a copy of each;
- Prints a report on the day's top 20 gainers and losers in the stock market;
- Prints ticker quotes for the six major stocks in your portfolio; and
- Logs off.

You must define such a routine. If the prospect of writing your own program gives you chills, relax. These programs are nothing more than step-by-step procedural lists (e.g., first dial a number, then wait for a message, then enter a word, and so on). After creating a routine, you explain the steps to the mainframe, via your PC, using a simple set of commands. CompuServe prefers to call such miniprograms, which are roughly equivalent to macros, "remote job scripts."

Writing a script involves nothing more than telling the PC to execute the steps. When you call up the EIS, you immediately see its main menu, from which you can access any of the EIS data bases. The scripts are executed from *The Professional Connection*'s main menu (see Figure 1); you are not yet on line to CompuServe. When you type one of the menu numbers (such as **4** for Quick Quotes) and press <Enter>, *The Professional Connection* executes a command script linked to your menu selection that automatically logs on to the EIS, moves from the EIS main menu (see Figure 2) to the stock quotation data base, and prompts for the name of a security. The sample script in Figure 3 accesses the *Washington Post.* (The script commands are on the left; explanations are on the right.) The CompuServe prompt is an exclamation point (!), which indicates that the service is ready to receive your input. In a script, the command Match delays execution of the script until the service issues the matching string of characters (such as "Company:"). The script command Send dispatches a string of characters as if you had entered them yourself. It is difficult to imagine how a communications package could be made any easier.

If you're a more experienced user, you can rely on *The Professional Connection*'s scripts to access other networks, such as your bank's home banking service, Western Union's Telex network, or ITT's Dialcom. You simply define the terminal parameters for these networks (phone number, bps rate, parity, and so forth) on a special menu and then indicate the terminal definition to use in the Login command for any given script.

The flexibility of these scripts is *The Professional Connection*'s big advantage. The program can execute logon, log off, and print commands within a

```
rem  script DAILY.RJS for daily routine


rem  - This script will obtain two reports for review
rem  - by a business executive.  It is a morning routine
rem  - that may be easily executed by an executive or a secretary.



rem  - STEP ONE: STOCK GAINS & LOSSES


MATCH "!"               !Where to?
SEND "go iq-200"        !Go to the Stock & Investment Service
MATCH "!"               !Wait for prompt
SEND "mqurep"           !Select particular S&I service
MATCH "!"               !Which stock exchange?
SEND "!"                !Select New York
MATCH "!"               !Which reports?
SEND  "1,2,3,11,12"     !Select  20  most active, largest gains, largest losses



MATCH "!"
SET PRINTER ON
SEND "S"                !Scroll the reports
MATCH "!"               !Reports are done
SET PRINTER OFF
SEND "go eis"           !Back to main menu



rem  - STEP TWO: STOCK QUOTES


MATCH "!"           !Select from main menu
SEND "go iq-100"
MATCH "Company:"    !Stock quote for which company?
SET PRINTER ON



SEND "ibm"          !Get the current IBM quote
SEND " "            !No more info, thank you
MATCH "Company:"    !Next company?
SEND "mer"          !Stock quote for Merrill Lynch
SEND " "            !No more info on Merrill Lynch
MATCH "Company:"    !Next stock quote?
SEND "c"            !Stock quote for Chrysler Corporation
SEND " "            !No more info on Chrysler


 MATCH "!"           !Any more info?
 SEND "off"          !No more info; log off CompuServe
```

Figure 4: This sample script, which illustrates a morning data-gathering routine, enables you to keep tabs on Wall Street.

script without human intervention—something *Crosstalk* and *Smartcom* cannot do. Although preparing scripts is a straightforward process, you should become familiar with the CompuServe service before attempting it.

You can save yourself from rewriting scripts if you first list the information you will routinely want and construct your script accordingly. The system assumes that you will usually follow the same routine in the same sequence. I found this to be *The Professional Connection*'s major drawback. You are bound by the script's logic, which is best suited to routines that do not vary from day to day.

Figure 4 illustrates a sample script that executes a morning data-gathering routine. The program reports on the stock market's top 20 winners and losers, then obtains stock quotes for three securities.

Averting Trouble

If this sounds like a service you can hardly live without, be aware that *The Professional Connection* and EIS will take some time to learn and that your installation may not be problem-free.

Becoming proficient with *The Professional Connection* will take about two days (I cannot think of any useful software that requires less time to learn). Set aside four to eight hours to read the documentation, then set the system up on the PC and play with it until you feel comfortable. On day two, study the script commands and create and execute your own scripts. This may take only two hours or a whole day, depending on how fast you are and how much fun you want to have.

No installation is complete without a few problems. Although the program is menu-driven and fairly straightforward, the documentation assumes that you're an intermediate-level computer user. If you're a typical executive, you know this assumption is well meaning but misguided. You may not know what an ANSI screen driver or a capture buffer or a log file is, why you might want to create new terminal definitions, or whether an error-free file transfer is possible in this lifetime. Persevere anyway. The manual is well structured and will reward your patience with an abundance of helpful information.

The Professional Connection is excellent for going into a selected part of a data base, getting a chunk of information, and getting out. There is no easy way, however, to jump from one script to another without having to log on to the service again. The best solution is to design one or two master scripts using the Login command and then write a handful of "generic" scripts that assume you are already logged on. Any combination of these—which in effect become submenus—can be inserted within a larger script and set up on the main menu for efficient execution. Running the master script then triggers each of the subscripts in turn.

Overall, *The Professional Connection* is a well-designed program that offers just the right trade-offs between flexibility and ease of use to suit its audience—the business professional who is most likely a computer novice. He or she is really looking for access to the various EIS data bases, and an executive can hardly ask for a better key.

Kirk Bottomly is a consultant for PA Computers and Telecommunications in Berkeley, California.

The Professional Connection and Executive Information Service (EIS)
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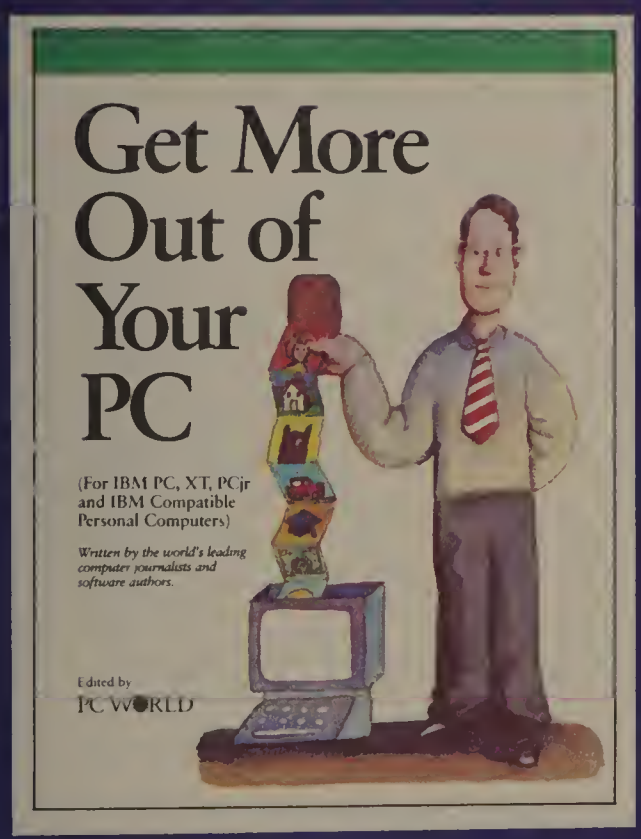

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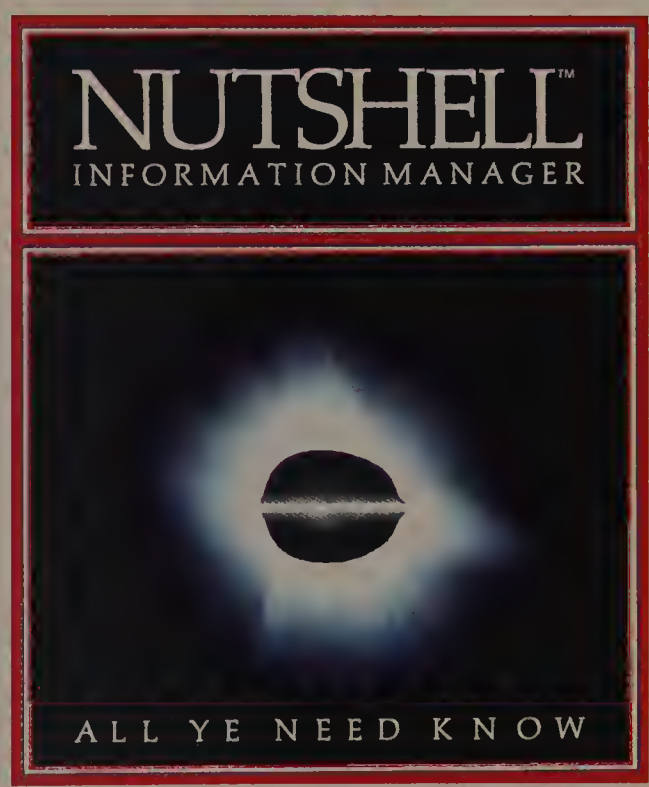

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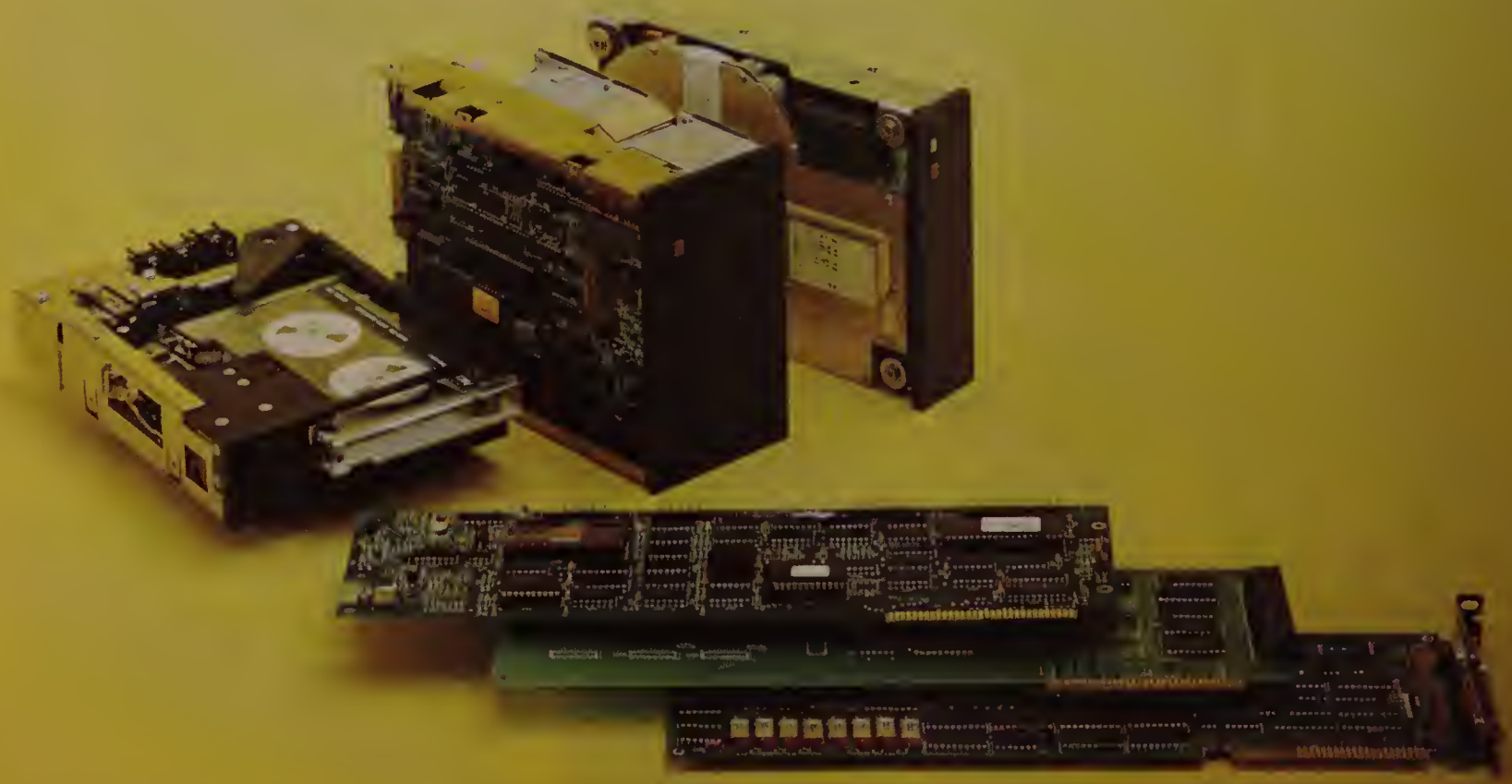

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The First Five Functions

DOS turns function keys <F1> through <F5> into special command-editing keys that eliminate some retyping and can help you fix typos.

Seth Novogrodsky

Application programs such as *WordStar* and *1-2-3* take advantage of the PC keyboard and assign commands to the computer's ten function keys. Although DOS (disk operating system) is probably the most popular program for the PC, many people are unaware that DOS also assigns functions to these same keys.

Some DOS commands, such as DIR, are quick and easy to type, but others are slow and cumbersome, such as

COPY CHAPTER1+
CHAPTER2 B:BOOK /V

Such long command sequences can be even more tedious if you have to type them frequently. Worse still is typing a long command and then realizing that you made a typographical error at the beginning of the line. Fortunately, the special DOS editing keys (see Table 1) can alleviate such problems.

Editing the Command Line: <F1> and <F3>

Normally, if you see a typographical error in a DOS command that you are entering, you press the <Backspace> key, <Ctrl>-H, or the <CursorLeft> key on the numeric keypad until you have erased both the error and any correct characters along the way; you then correct the mistake and retype the rest of the command line. If your mistake was at the beginning of the command, you are forced to retype the entire line. There is, however, an easier way.

Let's say, for example, that you have a DOS disk in drive A: and you want to give the command

CHKDSK B:FILE?.TXT /v /f

but you inadvertently transpose characters and type

CKHDSK B:FILE?.TXT /v /f

DOS, of course, won't find the CKHDSK.COM file and will dis-

play an error message. Rather than retype the whole command to correct the spelling of CHKDSK, you could press <F1>, type HK, press <F3>, and then press <Enter>.

Whenever you type a DOS command and press <Enter>, the command is stored in a special area of the PC's memory called the input buffer. Certain function

keys allow you to manipulate characters stored in this buffer. Pressing <F1> copies one character at a time from the buffer–in this case the C–and displays the character(s) on the command line. (Pressing the <CursorRight> key on the numeric keypad has the same effect.)

In the example, when you type the letters HK, you are actually typing over the next two characters in the input buffer. If you need to insert or delete characters in a line, you could use the <Ins> or <Del> keys. Pressing <F3> copies all the remaining characters in the buffer to the display. The correctly typed command CHKDSK B:FILE?.TXT /v /f can then be given by pressing <Enter>.

Pressing <F3> at the DOS prompt copies the last command issued to the screen, providing a quick way to issue the same command two or more times in succession.

Editing With <F2> and <F4>

The <F2> and <F4> keys make it easy to modify large chunks of a command line. For example, let's say that you need to compare files on a disk. If you want to compare FILE1 with FILE2, you could type:

COMP FILE1 FILE2

If you want to compare FILE1 with FILE3, you could type:

COMP FILE1 FILE3

However, you can conserve keystrokes if, after you compare FILE1 with FILE2, you type <F2> 23 <Enter>. <F2> copies and displays all characters in the

buffer up to but not including a specified character. Since you want to preserve the command line up to the number 2, you type 2 to tell DOS that the number 2 is the specified character. The screen displays 'COMP FILE1 FILE'. To complete the command, type 3, and press <Enter>.

<F4> skips over all the characters in the buffer up to but not including a specified character. <F4> is similar to <F2> in that the command should always be followed by a character. Using the <F4> key is generally more convenient than using the <Del> key to skip over characters in the buffer. For example, let's say that you enter the following command:

COPY B:PCWORLD.TXT MYFILE.TXT

If you then want to copy MYFILE.TXT to the disk in drive B: and rename it IBMFILE.TXT, you could type:

COPY MYFILE.TXT B:IBMFILE.TXT

But to save some keystrokes you could press <F2> and type B to restore everything up to the *B*. Then you'd press <F4> and type M to delete the text up to the *M* in MYFILE (that is, to delete B:PCWORLD.TXT). Then you would press <F3> to display the rest of the line, 'MYFILE.TXT'. Finally, you would press the <Space> bar, type B:IBMFILE.TXT, and press <Enter> to complete and execute the revised command.

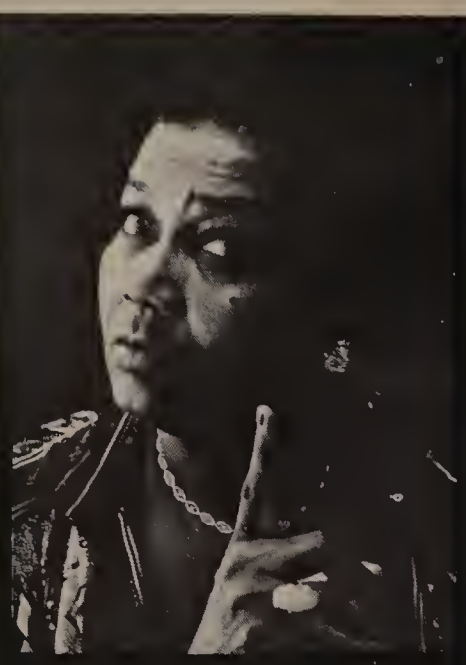

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Table 1: A description of the DOS editing keys

Key	Description
<F1>	Repeats previous command, character by character
<F2>	Repeats previous command up to a specified character
<F3>	Repeats last command in entirety
<F4>	Skips over characters in previous command up to a specified character
<F5>	Saves currently displayed line for editing and advances to next line

Fixing Typos With <F5>

Have you ever noticed a typographical error at the beginning of the command line just as you were about to press <Enter>? If you made a number of typos, the best thing to do would be to press the <Esc> key. This key cancels your misspelled command line, restores the previous contents of the buffer, and advances you to the next line. If, however, you made only a few errors, you should press <F5>.

<F5> advances the cursor one line and preserves the command in the buffer even though it does not display the command on the screen. After pressing <F5> you can make changes near the beginning of the command by overtyping or using any of the other editing function keys or the <Ins> and <Del> keys. When you finish making the corrections, simply press <F3> to redisplay the remainder of the command line, and press <Enter>.

You may wonder whether the DOS editing keys described here are worth all this trouble. If you use your PC regularly, the answer is a resounding yes. With a little practice you can master the special DOS editing keys and conserve many keystrokes. Once you start working with these special DOS keys, you will be surprised at how much time you save.

Seth Novogrodsky is a Contributing Editor for PC World *and PC World Books.*

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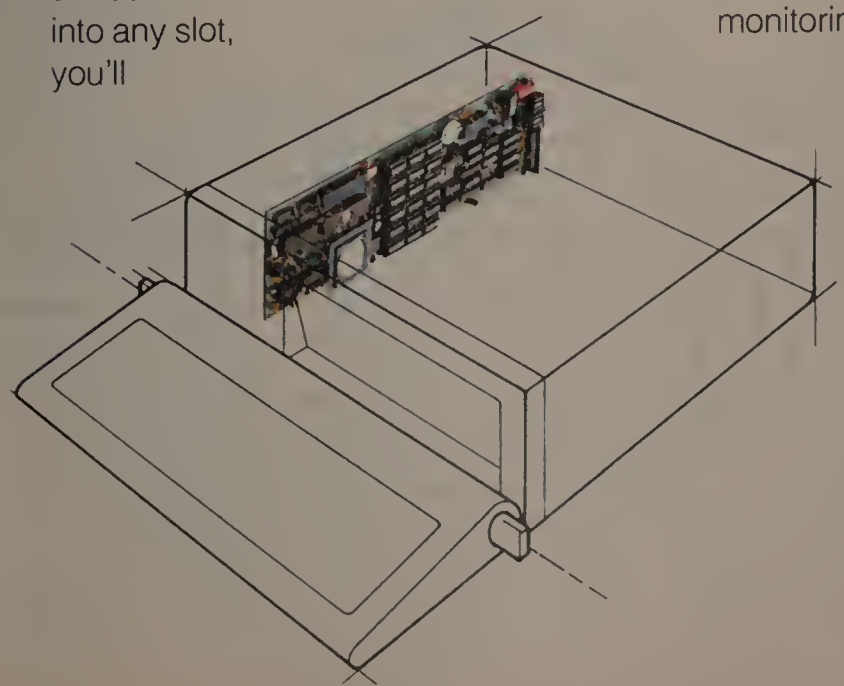

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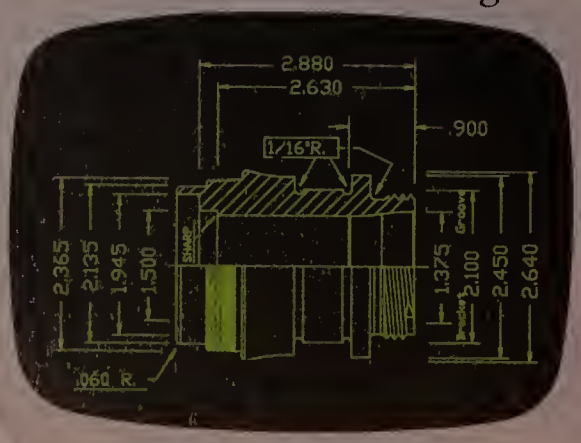

Architectural layout courtesy of Lansing Pugh, Architect

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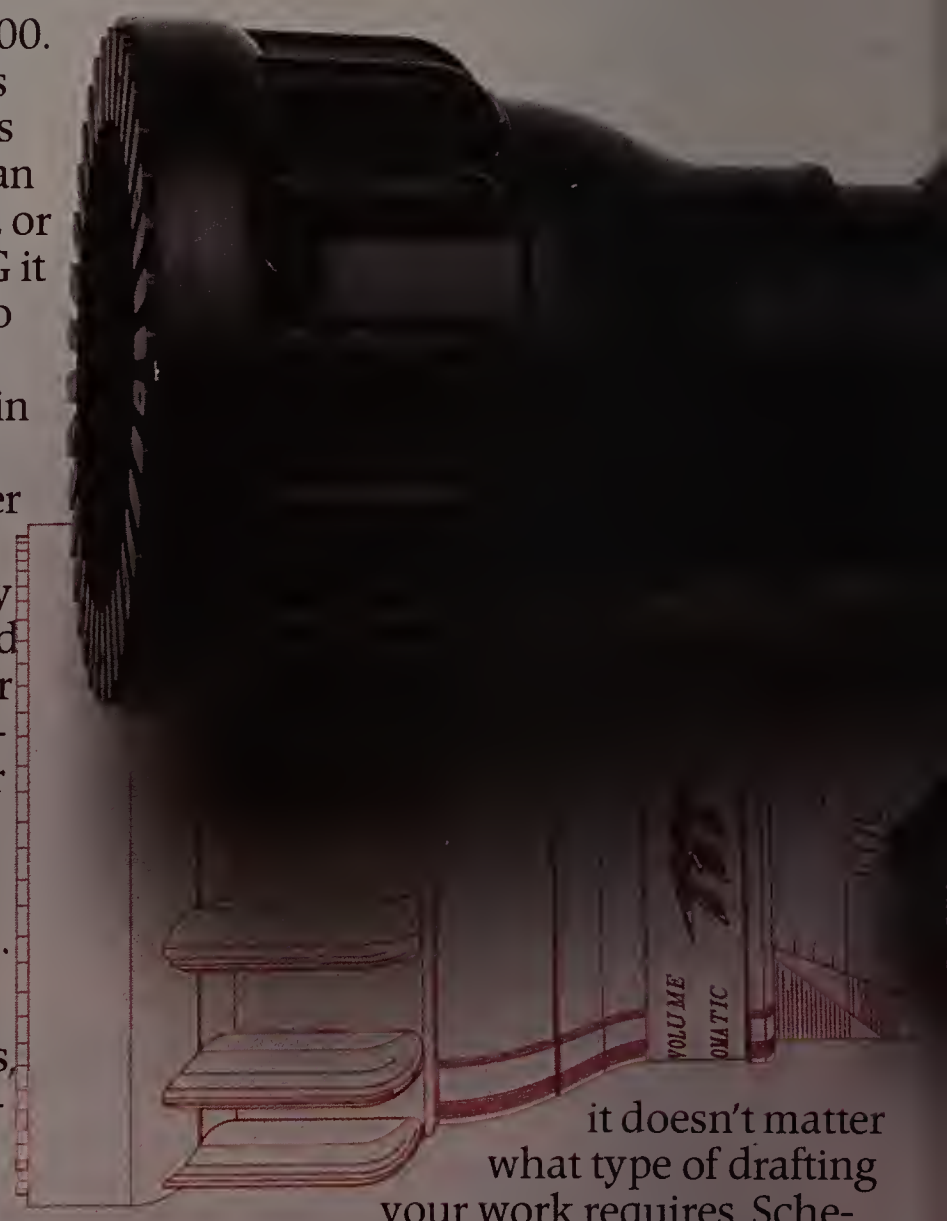

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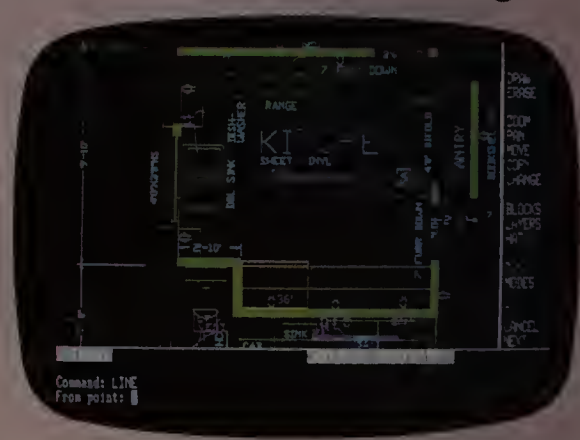

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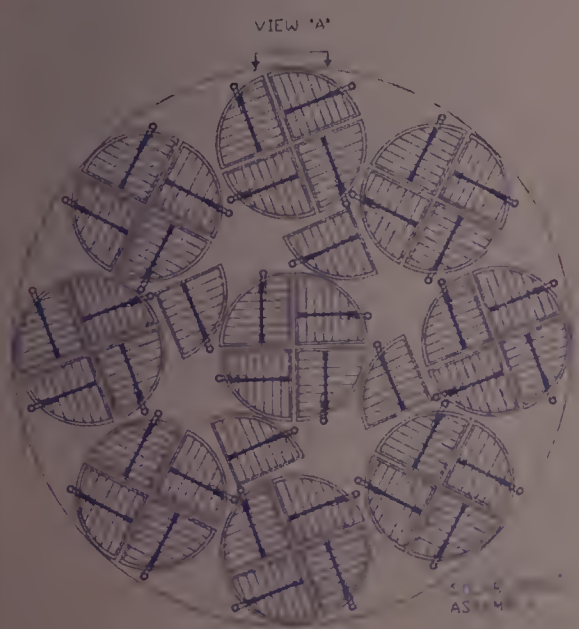

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The Help Screen

PC World offers answers and advice at every level.

When is BASIC not BASIC? Why is DOS distributed on single-sided disks? How can you dim WordStar's bright text characters? How does a batch file test for an empty DOS variable?

Karl Koessel

This month's column begins with a look at why calling IBM's BASIC.COM does not bring up the language on compatible machines even though they seem to run everything else. Then a reader asks why IBM distributes PC-DOS, which can write to both sides of a disk, on two single-sided disks. Another reader wants to turn down the intensity of *WordStar*'s text. And the last item demonstrates how a batch file tests for an empty DOS variable.

BASIC Misunderstanding

Q. Recently I purchased a Compaq computer with the understanding that it was 100 percent IBM compatible. Now I am having difficulty with a BASIC program written especially for the IBM PC. This program was created to allow my company's insurance carriers to do in-house preparation of group major medical illustrations on either the IBM Monochrome or Color Display.

The program works fine on the PC but not on the Compaq. When I place the program disk in drive A: and turn on or reset the Compaq, the disk spins and the DOS A> prompt appears. The disk continues to spin, and after a moment the words 'BASICA MEDICAL' automatically appear next to the DOS prompt. In another moment the screen goes blank and the disk stops spinning. At that point the Compaq feigns death; characters typed do not appear on the screen, and <Ctrl>-<Alt>-<Del> does not reset the machine. The Compaq must be shut off and restarted.

Why does this disk, which works in the PC, fail to run in the Compaq? Can you advise me how to make this program work on a Compaq?

Harvey Zimmerman
Rockville Centre, New York

A. There are two possible reasons why a BASIC program that runs on a PC might not work properly on a Compaq or other PC-compatible machine. First, if a program "writes" directly to the monochrome screen buffer (a section of memory on the video board that holds the characters for the monochrome display), the program will not work properly on the Compaq or any other machine that does not have a monochrome screen buffer. That includes any PC without a Monochrome Display Adapter or its equivalent. MEDICAL works on either display, so this is not the problem.

The difficulty you're having is due to the difference between the method used by the PC and that used by the Compaq to engage the BASIC language. The PC has a 32K read-only memory (ROM) chip that contains most of the BASIC language interpreter. When you issue the DOS command BASIC (or BASICA for the larger, more powerful, "advanced" version), DOS adds the PC-DOS disk file BASIC.COM (or BASICA .COM) to the PC's random access memory (RAM). BASIC.COM and BASICA.COM contain instructions that supplement the PC's ROM BASIC kernel—they do

not replace ROM BASIC nor can they function without the ROM BASIC kernel.

The Compaq does not have BASIC in ROM (nor does any PC compatible currently on the market). Instead, the entire BASIC language interpreter is combined in a disk file. When this file is called, the BASIC language interpreter is loaded into the computer's RAM, typically occupying from 50K to 60K of memory. Despite the differences in form, the BASIC contained in a disk file is very compatible with the BASIC that the PC uses when its disk file BASIC supplement is appended to its ROM BASIC. When you try to run MEDICAL on the Compaq, the automatic start-up file (AUTOEXEC.BAT) calls BASIC before loading MEDICAL. The BASIC file on that disk, however, contains the IBM PC BASIC supplemental instructions, not the full BASIC language interpreter that the Compaq needs to run BASIC. Therefore the Compaq "dies."

To correct this problem, place the Compaq DOS disk in drive A:, place the MEDICAL disk in drive B:, and turn on the Compaq. When asked, enter the date and time. Then type the command **COPY A:BASIC*.* B**: and press <Enter>. You should receive the message '3 File(s) copied'. Remove the Compaq DOS disk, place the MEDICAL disk in drive A:, and reset the computer by pressing <Ctrl>-<Alt>-<Del>.

Single-Sided DOS Disks

Q. File Command, *one of the programs in the IBM PC Computer Language Series, is particularly useful for letting a user know the degree to which a particular disk is filled. It also uncovers and reports the amount of space taken up by hidden files. Something that has me puzzled, however, is my PC-DOS 2.10 disk.*

File Command *indicates that this disk has a maximum of 179,712 bytes. This seems odd, as the total capacity should be twice that. In addition, there is an unusual hidden file, VENDOR-#.DA1, on the disk. The PC-DOS 2.10 Supplemental Programs disk shows the same size limitation and contains the same hidden file. By any chance, is IBM distributing these disks in a single-sided format? If so, why? Could the VENDOR-#.DA1 file be some sort of control?*

In "An Important Exercise: Backing Up Your DOS Diskette" in the chapter "Using DOS" in "Section 3. Operations" of the IBM Guide to Operations manual, users are instructed to issue the command DISKCOPY A: B: to make a backup of the DOS disk. Is there any reason not to use the command FORMAT B:/S to format both sides of a new disk and then, using the command COPY A:.* B: twice, transfer both the PC-DOS 2.10 files and the PC-DOS 2.10 Supplemental Programs files onto the new double-sided backup disk?*

A. L. Henrichsen
Arlington, Virginia

A. The function of the file you ask about is indicated by its name: VENDOR-#.DA1 tells IBM the identification number of the vendor, i.e., the disk-duplicating company responsible for producing that disk. The directory entry for VENDOR-#.DA1 consists of the name, a date, and a file size of 0. The entry also indicates that the starting cluster number for this file is 0, the invalid file cluster number used for a dummy file directory entry such as a volume label. Other than the date, this entry has no significance.

IBM distributes DOS on single-sided disks so that single-sided drives can read the files. It is a common misconception that DOS fills one side of a double-sided disk before writing to the second side. Actually, on a double-sided disk DOS first writes to the outermost track (farthest from the center) that has free sectors, then writes to the free sectors of the same track on the other side of the disk, then writes to the free sectors of the next track toward the center on the first side, and so on. Thus, DOS writes to a double-sided disk on the outer tracks of both sides before writing to the next inner track.

In "An Important Exercise: Backing Up Your DOS Diskette," you are instructed to use the command DISKCOPY so that you can then use the single command DISKCOMP to compare all the

files on the backup with those on the original. There is no reason not to put all the DOS files on one disk if the PC you use has double-sided drives. The only drawback to using the command COPY A:*.* B: is that if you want to compare all the copied files, you must use the command COMP repeatedly, because COMP compares only one pair of files at a time.

Bright or Light WordStar

Q. In "Another Set of WordStar Patches" (.*, PCW, Vol. 1, No. 7), contributor Alan Fridlund mentioned that he had patched his* WordStar *to present normal type in normal intensity and marked blocks in high intensity, but he didn't explain how to do it. This modification would make* WordStar *a lot easier on the eyes, especially during long sessions of slaving over a hot keyboard.*

Walter Malanga
Mobile, Alabama

A. Personally I prefer my word processor to present text in high intensity. I find the brighter characters easier to read. Maybe you should adjust the brightness and contrast of the monochrome display. If you still want to change intensities for *WordStar*'s normal and block text, you will need a copy of WSCOLOR.BAS, the BASIC program that comes with your original purchase, or a copy of the DOS utility DEBUG.COM.

The character attribute value *WordStar* uses for characters within a marked block or in menus is stored in the 389th byte of the file WS.COM. The character attribute value for normal, unmarked text is stored in the 396th byte. On a color display, character attributes determine the color of the characters and the rectangular cell in which the characters are displayed. On the monochrome display, the attributes may specify normal, underlined, blinking, high-intensity, or inverse characters. For your purposes you need an attribute value of 0F hexadecimal (which specifies high-intensity characters) for marked blocks and an attribute value of 07 hexadecimal (which specifies normal-intensity characters) for unmarked text.

WSCOLOR frees you from having to know file offsets or character attribute values. Although this BASIC program is intended for use with a color display, it can be used to specify the type of character *WordStar* will use on the monochrome display. To run WSCOLOR, load DOS (you should see the DOS A> prompt), then place a disk containing a copy of BASIC in drive A:, type **basic**, and press <Enter>. Now replace the disk in drive A: with the disk containing WSCOLOR, type **run "wscolor"**, and press <Enter>. When the disk in drive A: stops spinning, replace it with a copy (you should never modify an original) of *WordStar* and answer WSCOLOR's preliminary questions (two *y*'s and an <Enter> should do). When the screen entitled 'IBM WordStar COLOR INSTALL' appears, use the cursor keys to move the flashing asterisks to the lower left foreground and background "color" combination. Now press **M** for menu (this is also the "color" of *WordStar*'s marked blocks), **Y** for highlighting, **T** for text, and **N** for no highlighting. Your choice of text and menu "colors" appears under the heading 'NEW'. Now press <Enter>, then press **Y** twice, and the patch is complete.

To use DEBUG to place the character attribute values in WS.COM, load DOS, then place a copy of *WordStar* into drive B:, and place a copy of DEBUG.COM (the original can be found on the IBM DOS Supplemental Programs disk) in drive A:. Now type **DEBUG B:WS.COM** and press <Enter>. When the DEBUG prompt (a hyphen) appears, type **E 248** (which means "edit the byte at offset 248") and press <Enter>. A 4-digit hexadecimal number, a colon, the hexadecimal number 0248 followed by a space, the current attribute value for marked blocks, and a period will appear. (The attribute value should be 07 for your current *WordStar*.) Type **0F** and press <Enter>. The hyphen prompt will reappear. Type **E 24B** and press <Enter>. This time the program will display the current value for unmarked text, in your case 0F. Type **07** and press <Enter>. Now type **W** <**Enter**> **Q** <**Enter**>, and the patch is complete.

If you use WSCOLOR, you'll notice that inverse characters are available for menu (and marked block) or unmarked text. I find

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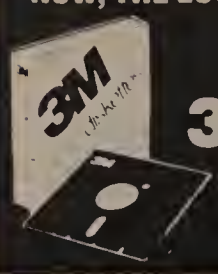

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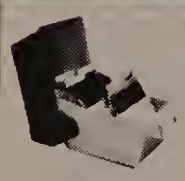

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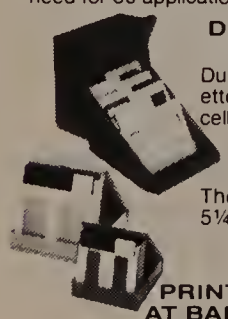

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marking blocks in inverse video to be more distinctive than simply changing the intensity—I can see whether a leading or trailing blank is included in a marked block. Column-mode marked blocks are also much better defined. If you are patching with DEBUG, the attribute value for inverse video is 70 hexadecimal (enter this number instead of the 0F in the previous procedure).

Batch Test for Empty DOS Variable

Q. I developed a "no frills" online help system for people in my office who are reluctant to use the DOS manual. It consists of several ASCII files, each containing up to a full screen of information on a particular command. These screens are called up via a batch file called HELP.BAT.

The ASCII files themselves are straightforward. Each has been given the name of the corresponding command and the extension .HLP; for example, COPY.HLP gives information about the COPY command.

HELP.BAT is also straightforward. Its only instruction (other than coloring the screen to identify a "help" screen) is TYPE %1.HLP. HELP.BAT works fine except that I don't like the way users must call HELP.HLP, which tells how to use the help facility. Typing HELP HELP works, but I would like to get the same result by just typing HELP. I tried IF %1 = "" and IF %1 = " ", but neither worked.

Leo Lefkowits
Houston, Texas

A. Only two minor errors stand in your way. First, a batch file conditional test (the IF command) for string equivalency is requested by the use of two equal signs. Second, batch files use the space, not the quotation mark (as does BASIC), to delimit a string. So how do we represent an empty string and avoid the syntax error generated when the double equal signs are followed by a blank? The answer lies in the way DOS concatenates strings and DOS string variables (%0, %1, %2, etc.). Simply add a dummy character (for example, the *x* in the second line of the following listing) to both sides of the double equal signs—IF '%1x = = x' is only true when the DOS string variable %1 is empty. The listing that follows demonstrates the techniques you want for HELP.BAT:

```
if exist %1.hlp goto does
if %1x = = x goto help
echo Help unavailable for %1
goto end
:does
type %1.hlp
goto end
:help
type help.hlp
:end
```

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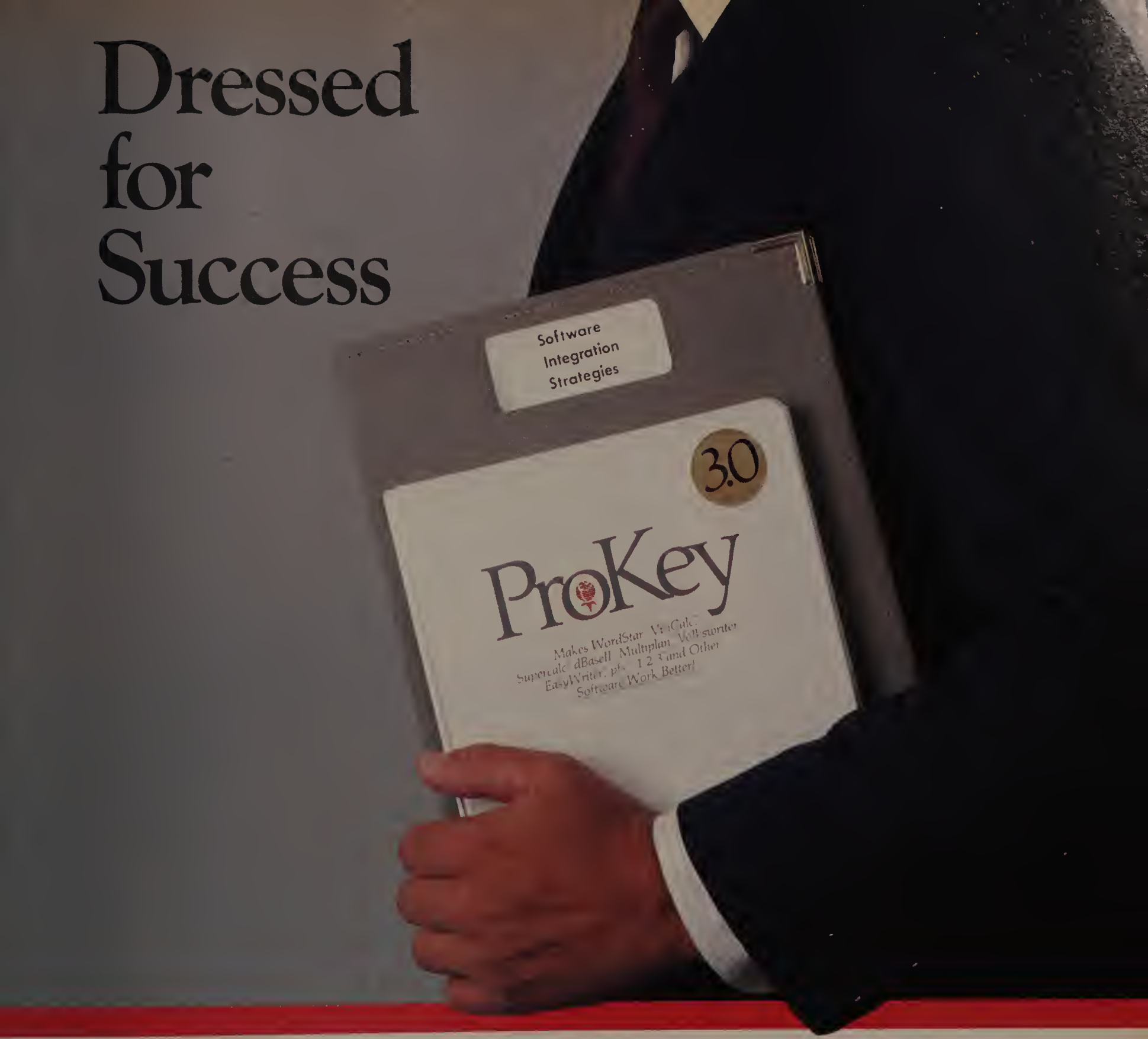

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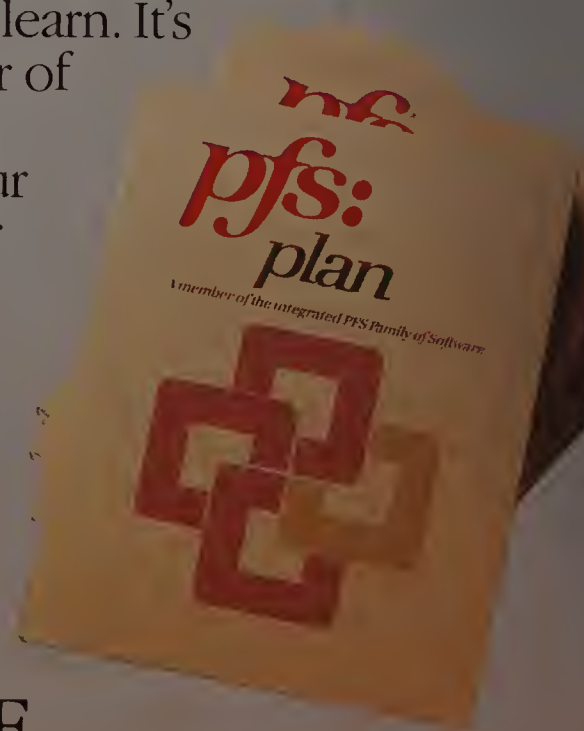

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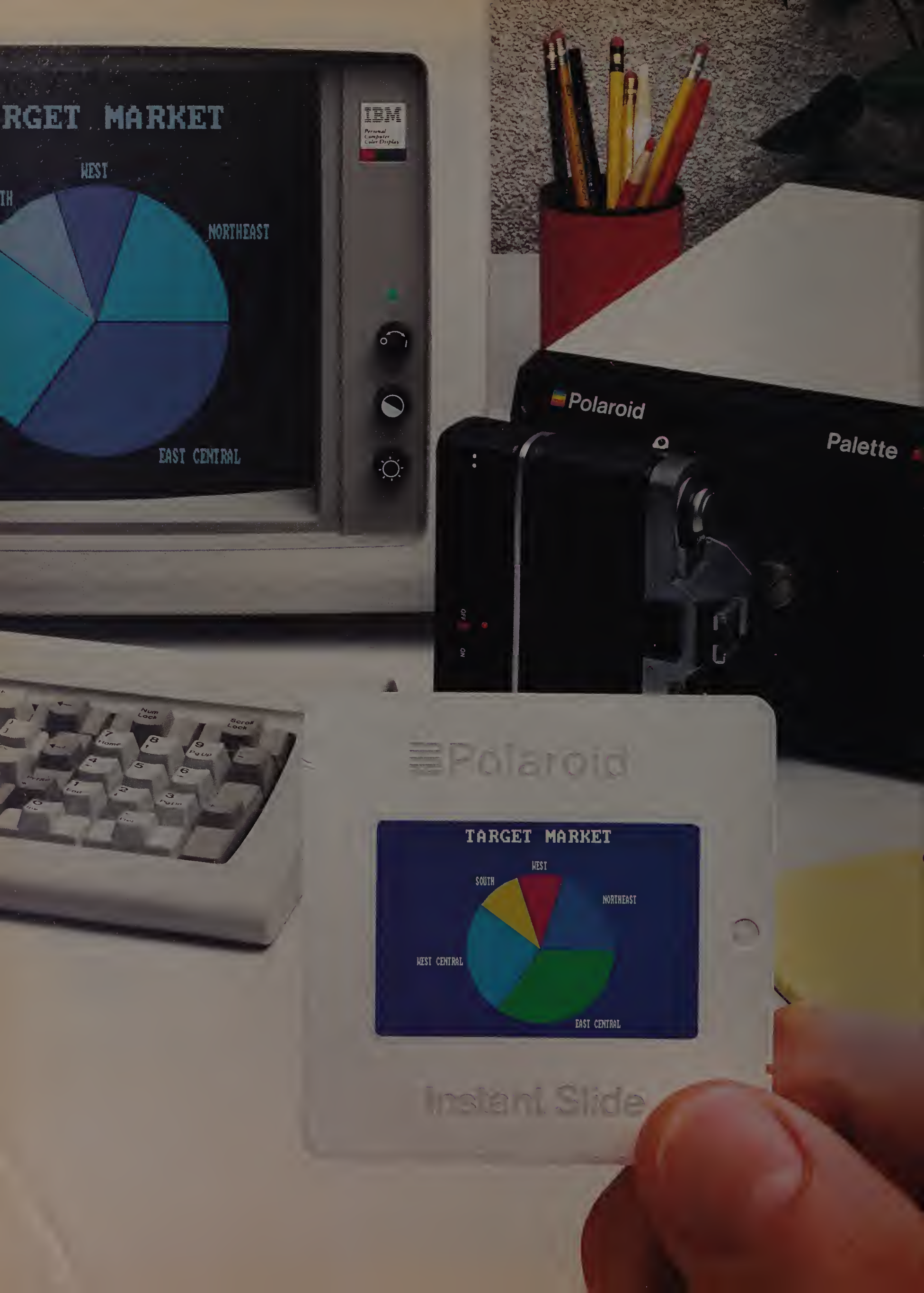
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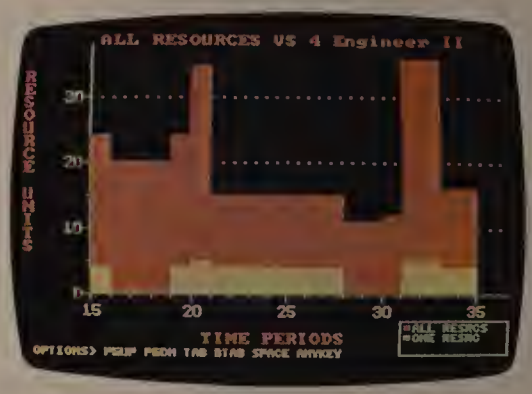

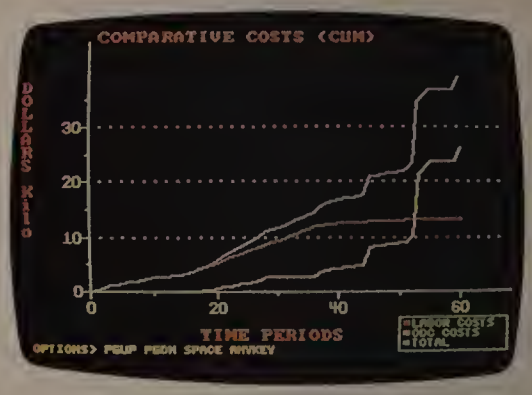

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Hollywood PC

The entertainment industry is fast-paced and chaotic. Yet, like other businesses, film and television studios have budgeting, scheduling, and production problems that can be lessened with the help of PCs. Software aimed at the motion picture industry is appearing for script writing, budgeting, scheduling, and tape editing, and most of it is written for the IBM PC.

Eric Brown and John Faulkner

Sid Swizzlestick waded through the smoggy parking lot to the front office of Swizzlestick Productions. In his briefcase he carried three scripts he had flipped through the night before. Maybe the female stunt driver story had a chance, but the rest just didn't read. When he entered the office, his secretary followed him to his desk, blandly rattling off the bad news: the directors' union was threatening to strike, the new Compu-Grandma detective series was taking a Nielsen nosedive, some tapes had come back from location with the audio missing, and there was an urgent message from the network. Sid looked up from Variety *and smirked. "Beautiful . . . total madness . . . I love it."*

Making pictures has always been risky, but the recessions of the seventies and eighties brought economic reality home to roost in Hollywood. Enormous cost overruns have become difficult to tolerate. As greater attention is focused on the bottom line, increasing numbers of computers are used to monitor that line.

Most of the major studios and networks have used mainframe computers for years, but smaller production companies are only now getting a taste of computing power with personal computers. Meanwhile, the big studios are finding PCs a welcome supplement to their mainframes.

Yet, running counter to the PC wave is a formidable undertow—the temporary nature of Hollywood makes computerization difficult. A network usually orders only six episodes of a show at a time, and whether or not the show will be renewed is far from certain. A television production team may assemble for a couple of months and then disband. Even if the show is picked up, the staff can change frequently. In a business where chaos is the norm, the task of setting up the training and organization necessary for the effective use of computers is often postponed indefinitely. Yet the breakneck pace and

complexity of production beg for the use of fast and portable computers. The ability to know at any given moment whether the production is staying within budget is vital.

IBM PCs are popping up all over Hollywood. For example, Lorimar Productions, which produces "Dallas," is now in the process of automating every department with IBM PCs and NBI PCs tied into a mainframe. Lorimar uses telecommunications to link all its offices around the country.

Twentieth Century Fox has been using mainframes for years and was one of the first studios to see the benefits of connecting PCs into its IBM 4341 mainframe. Fox's top management uses Lotus Development's *1-2-3* for analyzing production costs and creating corporate financial statements; *dBASE II* and *R:base 4000* are used for inventory and other data management needs. In production, Fox uses a computer-aided design (CAD) package from Personal Systems to design stage sets. For script writing and other word processing, Fox relies on an IBM 5520 dedicated word processor and on PCs equipped with IBM's new 5520-compatible word processing program, *PC Writer.*

Fox was also the first motion picture company to take PCs on location to update budget and accounting information. PCs have hit the road for such shows as "Trapper John, M.D.," "The Fall Guy," and "AfterMash." Appropriately enough, PCs were heavily involved in the production of the Fox movie *The Revenge of the Nerds.*

A Show Is Born

The first step in developing a television show is coming up with an idea. The producer consults with scriptwriters, story editors, and other key creative people to hone the idea into a pitch the networks will like. If a network shows interest, the approval ritual begins and scriptwriters are hired (see "Script Writing Software").

The network usually makes major revisions based on cost, moral standards, and actors and actresses they have under contract. The story goes back and forth for a number of revisions, and finally the network inks the deal.

During the approval ritual, the production company comes up with a budget. The first budget is used to negotiate the licensing fee—the money the network will pay for a certain number of episodes. A lengthy negotiating period ensues in which budget after budget is churned out.

'The computer won't save you any time. It's a little like moving into a larger house . . . you suddenly have more things to fill it with.'

Once the budget is approved, the production company jumps into action. When the buyer or network gives the go-ahead on a show, everything has to be done yesterday. In this preproduction phase, schedules are hammered out, the cast and crew are hired, and sets are designed and built. If other shows are being produced at the same time, enormous logistical problems must be ironed out.

When shooting begins, the best-laid plans can turn into scheduling nightmares. Inevitably, problems develop with sets, props, weather, talent, unions, and other variables. After shooting is wrapped up, the postproduction phase begins. The videotape or film is edited, and music and special effects are mixed in. When the show is finally in the can, the production company staff shrinks, as most of the freelance employees fade away.

Sid's fat red fist grabbed the cigar out of his mouth just before he choked on it. "You can't do this to me!" Sid's face turned crimson as he shrieked over the phone, "You gave us story approval three months ago!" The network monotone at the other end of the line had a few more things to say before Sid erupted again. "You're crazy! We changed that character four times for you guys already, and now you want me to change the sex? As if that won't change anything else in the story? Listen, Fred, these last-minute 'minor' changes are going to put me in an early grave. Let's get together at six for a pop and talk about this sex-change thing. Yeah, right. Ciao."

The Producers

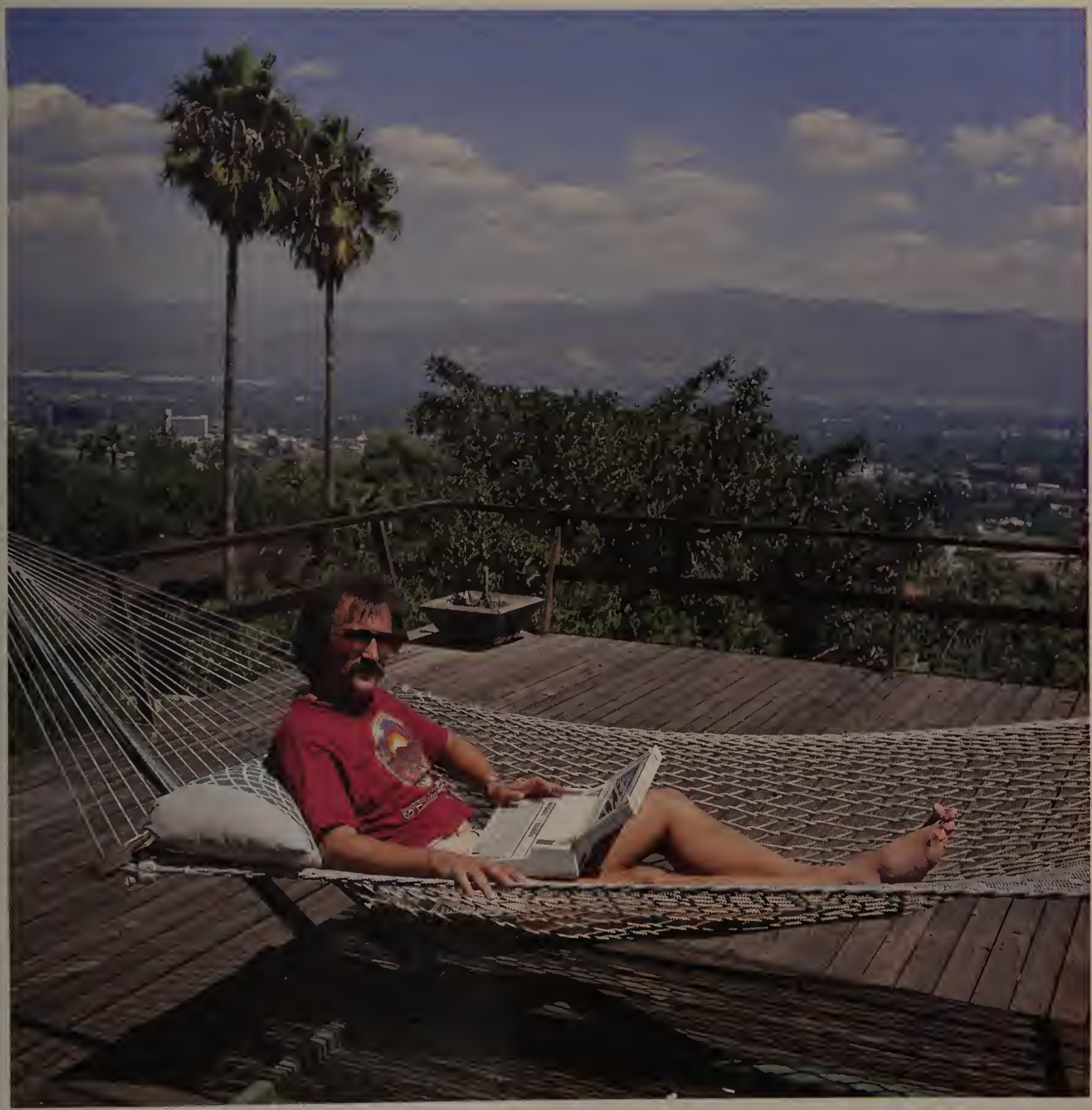
The phenomenon of the PC in Hollywood became apparent this summer at The Micro Show, an exhibition and conference on personal computers in the entertainment field held in Los Angeles. The Micro Show was the first trade show to focus on the special problems of using personal computers in the television, film, commercial, and music industries. A second Micro Show is planned for June 12-15, 1985, at Santa Monica Civic Auditorium.

Phillip DeGuere, keynote speaker at The Micro Show and executive producer of "Whiz Kids" and "Simon and Simon," was one of Hollywood's microcomputing pioneers. A few years ago a writers' strike gave him time to play around with his Apple II and fantasize about how computers could revolutionize the industry.

"I started thinking, Wouldn't it be great if I had a computer program that could tell the difference between exterior and interior scenes?" relates DeGuere. "It could identify a car as a vehicle, a name as an actor, and a fall as a stunt. It could generate a budget and a shooting schedule, and it would appear on all the connected terminals."

DeGuere's dreams are possible today. Many of the 52 exhibits at The Micro Show were dedicated packages written by and for people in the industry. These entertainment software packages are usually easier to use than generic programs, an important consideration in a business with many freelancers and little time to train them.

Although DeGuere owns 12 computers, he cautioned newcomers not to expect too much from their PCs: "The computer won't save you any time; work expands to fill the available space or time. It's a little like moving into a larger house . . . you suddenly have more things to fill it with."



Producer Philip DeGuere at home with an HP 110 Portable from Hewlett-Packard. DeGuere was one of the first to see the advantage of using personal computers in TV productions.

Script Writing Software

Along with accountants, scriptwriters are leading the PC charge in Hollywood. Especially in television, where a script can change several times in a few hours, a word processing system brings immense time savings to a professional screenwriter or teleplay writer. Scriptwriters who use computers form a kind of subculture in Hollywood. Many share word processing tips in a newsletter published in Burbank, California, called *Word Processing News.*

Once scriptwriters began to take word processing for granted, they wanted more. Trying to get a script into the rigid style required by the Writers Guild of America is no easy task. Variable indents, headings, and page breaks have to be inserted manually in most word processing programs.

"With *WordStar* it takes about ten keystrokes to change margins," says Stephen Greenfield, the co-owner of Screenplay Systems of Burbank and the programmer of a screenplay formatter program called *Scriptor.* "If you change margins frequently, you're going to go absolutely up the wall. If you spend $4000 on a computer and software, you don't want to still have to do things by hand."

There are several ways a screenwriter can automatically set up these formats. One solution is to enhance a word processing program with keyboard macro programs, such as *ProKey* or *SmartKey II,* that can insert character names and formats into a script automatically. *FeatureFormat,* a macro program from PowerSoft of Burbank, comes equipped with macros that rearrange scripts into standard screenplay formats.

The new generation of word processing programs that provide macros and style formats has also been welcomed by scriptwriters. With *Microsoft Word,* for example, you can create a "style sheet" that takes care of many of these problems. (See "Getting the Word," *PCW,* Vol. 2, No. 4, for a sample screenplay style sheet for *Microsoft Word.*) However, neither *Microsoft Word* nor the other macro programs contain the logic necessary to make the "interactive" page breaks required by Hollywood custom. The rules say that a character's name cannot be severed from his or her dialogue, and action slugs (narrative descriptions) must not be separated from the scenes they describe.

The problem of interactive page breaks has spawned several formatting programs such as *Scriptor.* To use *Scriptor,* you save the finished script as an ASCII file and run the format program on it. *Scriptor* knows where to break a page and also adds indents, *CONTINUED*s, and other formatting requirements.

Perhaps the simplest solution is to buy a word processor specifically programmed for screenwriting. A script writing program called *Powerscript,* from Beaman Porter, not only provides a number of typical screenplay styles but can also generate a script in the two-column "videoscript" format used in commercials, corporate and industrial films, and videos. The videoscript style calls for two matching columns, one for the video and one for the audio. Both columns can be scrolled independently on the screen.

However, even *Powerscript* hasn't solved the problem of interactive page breaks. Hollywood's writers will have to wait a while longer for the perfect script writing program.

Sid slammed down the receiver. "Jane!" he screamed, bypassing the usual office intercom with sheer lung power. On the third downbeat, associate producer Jane Justly rushed into the room, just as Sid's blood pressure was reaching critical levels. "It's the network again," he snapped, "mucking up a perfectly good story just as we're polishing the second episode." Sid was sucking air in short gulps. He loosened his tie.

Jane looked concerned. "S.S., do you feel okay?" Sid didn't hear her. His blood pressure had peaked, and his asthma kicked in from all the stress of the morning. He clawed through his top drawer for his inhaler. It was wedged in the back right corner behind the publicity shots of the latest muscleman the network was trying to shove down his throat.

Producers are usually hesitant to waste their precious time learning about and using computers. They have other people around—usually the associate producers—to provide the information they want. An associate producer's primary responsibility is to keep track of scripts, accounting, and scheduling and to report everything to the producer.

Jerry Jaskulski, associate producer of "General Hospital," uses a Radio Shack TRS-80 for budgeting and long-term scheduling. He also uses the computer to track the development of the labyrinthine plots in this interminable soap. Jaskulski uses a data base management program called *Query* to search through a data base of past shows.

"What show did Sue get murdered in? I could go in and pull out the information," relates Jaskulski. "If I want to know what happened in Show 85, I can punch it up and find out what happened to all of the characters in that show."

Although executive producers today often refuse to use computers, their successors will probably be more motivated. Eventually some associate producers will become executive producers, and many will bring their PCs with them.

"I'm fine, I'm fine," Sid gasped. "It's the show that's in trouble. If those guys push this thing in too many more directions, they'll be flushing a hit right down the proverbial tubes."

"Let me guess," Jane said. "They want to change Norman back into Norma again."

Sid looked up from his scattered papers in surprise. "That's right, kid. How'd you know?"

"When they changed Norma to Norman the last time, I just assumed they'd change him . . . er, her . . . back," Jane said calmly. "But then they signed for the fee and everyone assumed we were writing the show with these major decisions out of the way. Well I've still got the old story versions on disk, and I went ahead and worked out three stories in case we changed Norman back to Norma."

"Yeah, that's fine, but now the budget's shot to hell."

Jane handed him several sheets of paper. "I thought of that and got back on the spreadsheet. I've already roughed out several 'what-if' situations for this eventuality."

"Well, it's about time you got that damn machine to work," Sid sneered, a clear sign to Jane that her boss was impressed. Even though Sid had authorized the purchase of the PC and was constantly asking her to show it off to visitors, Jane had the distinct impression that Sid felt it was a waste of time.

One advantage PCs have over mainframe systems is that they can generate budgets and cost reports in standard studio formats.

A Budget That Looks Like a Budget

Not surprisingly, accountants and auditors are the most enthusiastic users of personal computers. Gig Rackauskas, an independent auditor who currently works for Twentieth Century Fox, was the first to use a PC on location. Rackauskas tested an on-location auditing package written expecially for Fox called *Constant C,* and then demonstrated it to Warner Brothers, MGM, and Universal.

When Rackauskas is on location, she sends budget, accounting, and payroll information back to Fox on a floppy disk. Now she is venturing into telecommunications. "That's the ultimate," says Rackauskas, "sending back daily cost information from location to the studio."

Jolie Kramer is another freelance auditor hooked on the PC. She recently used a dedicated budget program called *DotZero* (from DotZero, Inc., of Los Angeles) to produce cost account reports on location in Colorado.

"The associate producer never had to come to location," says Kramer. "We brought the show in under budget, and the reason we were able to do that was because of accurate decision making."

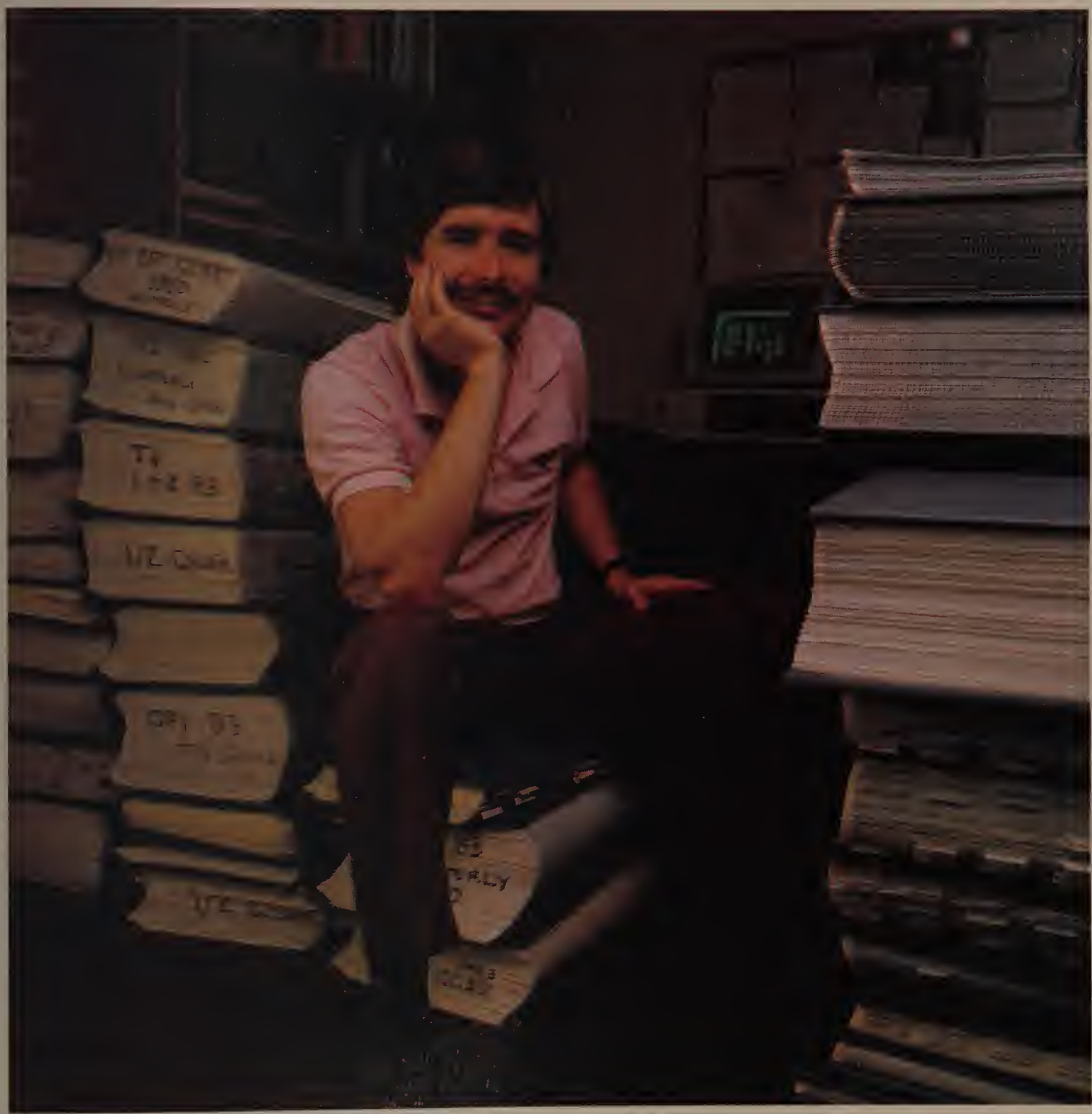
One advantage PCs have over mainframe systems is that they can generate budgets and cost reports in standard studio formats. Mainframes don't have that flexibility, but spreadsheets do. Adds Kramer: "A producer wants to see a budget that looks like a budget."

Kramer prefers industry-specific packages like *DotZero* over general-purpose PC software, because she finds them easier to learn and use. "You don't know what circumstances may come up when somebody else might use the machine," she noted.

Like other auditors and accountants, Kramer wonders how she ever got her job done without the PC. "I could never go back to doing it manually," says Kramer. "The computer leaves you more time to analyze the work and see how you can save money. It lets you use your brain."

Orion Goes PC

We visited accounting associate Kevin McLaughlin at Orion TV Productions, an independent production and distribution company that handles films and television shows. The cramped accounting office was equipped with several PCs and PC XTs. As we interviewed McLaughlin, the printer was running off the latest ratings sent via modem from an on-line service run by the A. C. Nielsen Company. Nielsen also sells a custom data base management system, *MicroNode,* for use with its on-line service. With *MicroNode* a user can easily pinpoint and cross-reference ratings by such market variables as station, time period, and program and then generate the appropriate report.



Accounting Associate Kevin McLaughlin at Orion TV Productions. Accountants have spearheaded the micro movement in Hollywood.

"ANY PICTURE" MAJOR MOVIE MAKER BUDGET
2 HR TV MOVIE 20-May-84
20.00 DAYS PHOTOGRAPHY @ 12 HOURS
5.00 DAY WEEK LOS ANGELES SHOOT
15.00 % OVERTIME

ACCOUNT	DESCRIPTION	RATE	PREP & WRAP 10.00 hrs = 11.00 pay hrs	SHOOT 12.00 hr= 14.25 pay	ACCOUNT TOTAL
		ABOVE-THE-LINE			
01	PRODUCER	page 2			181,500
02	DIRECTOR	2			75,768
03	SCRIPT	2			59,000
04	CAST	2,3			271,793
06	RESIDUALS	3			92,218
09	PAYROLL TAXES	4			78,056
TOTAL	ABOVE-THE-LINE				758,335
		BELOW-THE-LINE			
10	PRODUCTION STAFF	4			100,727
11	CAMERA	4			38,771
12	SOUND	4			22,699
13	SET DESIGN	5			13,421
14	CONSTRUCTION	5			34,619
15	GRIPS & STANDBY LABOR	5			34,176
16	TRANSPORTATION	5,6			125,945
17	ELECTRICAL	6			33,711
18	WARDROBE	7			50,865
19	SET DRESSING	7			72,176
20	PROPS & SPECIAL EFFECTS	7			41,244
21	MAKE-UP & HAIR	8			20,968
22	PICTURE & SOUND DAILIES	8			72,202
25	LOCATION	8			158,620
27	EQUIPMENT	9			42,775
29	PAYROLL TAXES	9			156,987
TOTAL	PRODUCTION COSTS				1,019,905
30	LABORATORY	9			23,400
31	MASTER PRINTS	9,10			18,139
32	FILM EDITING	10			80,342
33	STOCK SHOTS	10			3,000
34	POST PRODUCTION SOUND	10			36,380
36	MUSIC	11			40,000
TOTAL	POST PRODUCTION				201,261
42	INSURANCE	11			16,500
43	OTHER EXPENSES	11			4,000
TOTAL	OTHER COSTS				20,500
TOTAL	BELOW-THE-LINE				1,241,666
TOTAL	ABOVE/BELOW-THE-LINE				2,000,000

Figure 1: Typical movie budget from a 1-2-3 template written by Kevin McLaughlin of Orion TV Productions. Note that much of the cost is split between above-the-line (fixed) costs and below-the-line (variable) costs.

Although Orion continues to send the bulk of its general ledger accounting to an outside data processing service equipped with a mainframe, the PC has become indispensable for creating cost reports and budgets. McLaughlin introduced personal computers to the company when he brought in his Apple II to show the staff. That was only the beginning. Now Orion generates budget revisions with the help of a *1-2-3* template that McLaughlin wrote himself (see Figure 1).

"Our chart of accounts may have several hundred line items," says McLaughlin. "It was impossible to handle that with the Apple II. It was sort of possible using the IBM PC with *VisiCalc*, but with the PC running *1-2-3* we have no problems."

McLaughlin chose *1-2-3* instead of a dedicated budgeting program because of its flexibility. "I shy away from dedicated programs. You can only look at one account at a time. With *1-2-3* you're able to match the format you create to your particular budgeting philosophy."

The PC is particularly helpful during license fee negotations with the networks. A seemingly endless series of budget revisions must be generated on short notice. "You need to be able to play those 'what if' games," says McLaughlin. "Now we can change the budget in an instant and have it immediately updated."

During production of a show, McLaughlin can use his *1-2-3* template to create a cost report and see where money has been spent on a daily basis. He can report what percentage of money was spent on various phases of the production and how many hours a day the union crew worked. "I've tied all the labor items into a fringe factor on the template. When I change the number of days or add crew members, the budget is updated automatically."

Scheduling Headaches

In Hollywood, there is no such thing as a production completed on schedule. Imagine you are an assistant director in charge of scheduling the shooting of a soap opera. It's been a trying day, and as you spill into overtime you look around the set and calculate the extra labor costs. Suddenly you realize you're going to have to bring in two new makeup people because you've already worked the day crew 12 hours. And you'd better get that kid off the set, because the teacher and the social worker are beginning to complain. You've got all these permits to sign and you remember that Suzy's house burns down at the end of the scene, so the pyrotechnician has to come on when there are not a lot of people on the set. But now that the break-up scene is running late, you need some of those people on the set after all, and maybe you could schedule the fire scene for tomorrow instead. But then the hospital scene would have to be bumped.

To cap it all off, the leading man of the show has a nervous breakdown, and the day's taping has to be rescheduled. At this point you, the assistant director, may be ready to join him in the padded room.

'I've tied all the labor items into a fringe factor on the template. When I change the number of days or add crew members, the budget is updated automatically.'

Although the PC can't solve all of these problems, it can keep the random variables from becoming overwhelming. New production scheduling software is giving assistant directors, production coordinators, line producers, and unit managers control over their constantly changing schedules.

The key to managing this scheduling monster has traditionally been a chart called a stripboard. First a script is broken down into exterior and interior scenes, day and night scenes, locations, materials needed, cast, and other critical data. This information is then mounted on a stripboard. Most studios still extract this information manually, but now dedicated indexing programs can search and cross-index a word-processed script by key words and page numbers to create the breakdown automatically (see Figure 2).

With scheduling software, you can generate a number of production lists from the script breakdown. For example, a "day out of days" shows each

```
DATE:07/02/84
    TITLE:THE BIG PICTURE
    COMPANY:RIGHT-NOW PROD.
    PRODUCER:JERGIN LANDSDOWN
    DIRECTOR:MINION MINOR
    1st ASST DIR:RALPH K. DAVIES
    PROD NO.:001
                        ONE-LINE SCHEDULE              Page  1
==========================================================================
#    DAY   SET/SCENE NO.                          D/N PAGES
==========================================================================
#1   MON      MAIN CABIN OF THE FREIGHTER        (D)  7/8
08/01/84   Sc: 1,2
           Loc: BAR HARBOR          MAINE
--------------------------------------------------------------------------
#2   TUE   INT ARTHURS CABIN                     (D)  1 1/8
08/02/84   Sc: 4
           Loc: BAR HARBOR
--------------------------------------------------------------------------
#3   WED      MAIN HANGAR                        (D)
08/03/84   Sc: 51,52
           Loc: ALAMEDA NAVAL AIR  STATION, CA
              MAIN HANGAR                        (N)  1
           Sc: 23,24
           Loc: ALAMEDA NAVAL AIR  STATION, CA
--------------------------------------------------------------------------
```

Figure 2: Sample script breakdown from the AD/80 production scheduling package. AD/80 searches and cross-indexes a word-processed script and generates strips, which are mounted on a board.

actor and actress's shooting schedule, with the cast names and character names running down the page vertically. The day and date of each shoot runs across the horizontal axis of the page.

A shooting schedule can also be made from the script breakdown. This is a Gantt, or time, chart of each shooting day that gives a brief scene description followed by specific information pertaining to location, time, actors involved, transportation, and props.

Tom Lofaro, assistant director of a film called *The Sure Thing*, used a script breakdown program from Alnitak Computing Company of San Francisco called *AD/80*. After creating the stripboard, he was able to generate a full shooting schedule and other standard production forms.

"If you do a stripboard yourself from the script, it might take you a couple of hours," says Lofaro. "With *AD/80* it takes us 20 minutes to create it and 6 minutes to print it out."

The updated charts and lists can be rapidly disseminated throughout the production so everyone can keep up to date on the latest scheduling changes. "If your various departments know what's going on and know what your intentions are, they can support you better," says Lofaro.

Post Production

Razor blades haven't been used to edit videotape since the early seventies, but the software to interface electronic editing systems with personal computers has been slow in coming. Using a PC, an editor today can link a record log that describes each shot and take with the corresponding images on the

videotape itself. If there is a change in the scene sequence, the editor changes only the text portion of the record log. The PC automatically rearranges the takes on the videotape. (For more information on PC logging systems, see "PC-TV," *PCW*, Vol. 2, No. 2.)

Although videotape editors can now take advantage of the PC, no software for film editors yet exists. Film productions must either use old methods or buy expensive dedicated film editing systems such as the Editdroid from Lucasfilm Ltd. or Montage's Picture Processor. These computerized editing systems gang a number of microprocessors with a multitude of monitors in an attempt to speed up editing without sacrificing the intuitive nature of the editor's craft.

Before the Thread Snaps

The PC has made inroads into Hollywood in most facets of production, but the freelance nature of the business remains an obstacle. It's hard to fit computer training into production budgets that are already stretched to the limit.

"We can't get the production department to use the PC," says Kevin McLaughlin. "They say, 'Gee this is great,' and then they go back to their old ways. Everybody's always busy and thinking about the next show. It takes somebody who is already hooked on the computer to make the switch."

"Cost is a big factor," says McLaughlin. "Computer training is a hefty investment in an industry where you don't know who is going to be employed tomorrow." Yet this hefty investment may be mandatory if Hollywood wants to kick the cost overrun habit.

"In the entertainment business the prevailing mode of operation is chaos," says Phillip DeGuere. "The computer points to fiscal responsibility. If we all want to continue to make money in this capitalist society, we can't have cost overruns of $50,000 a production."

As production companies strive to become more competitive, the computer becomes a necessity. The chaos won't disappear—and maybe it shouldn't—but with a PC, decisions can be made as quickly as the problems arise. As Tom Lofaro says, "It always amazes me how many times we seem to be making movies on a thread, and the last piece of that thread is about to snap. I'll tell you something . . . they'd better get used to this technology."

Jane watched Sid's expression change from a scowl to a smile as he scanned the budget revision. Then she plunged ahead. "See, I've already put down the possible set changes and adjusted the budget for the critical rewrite."

The color was coming back to Sid's cheeks. "Yeah, yeah, I see what you mean. Why should we have to eat these writing costs when they're yanking us around with the distribution clause?" Sid was grinning from ear to ear. "We'll make these network guys look like chumps when their accountants ask them about this rewrite fee. But it's right there in black and white."

Sid unwrapped another illegal Corona and lit up with a smug look of assurance. "Looks like this little screw-up is going to turn into a windfall for us. Let Uncle Sid buy you a treat. Just name it."

Jane thought a second and said, "How about a RAM disk emulator?"

"No, no, nothing kinky like that. . . . "

"No, S.S.," Jane interrupted. "It's a circuit board for the PC that makes your—"

"Save the speech," Sid barked as he grabbed his sunglasses off the desk. "Just add it to the budget. Now come on. . . . Let me buy you a pop."

Eric Brown is an Assistant Editor at PC World. *John Faulkner is a freelance writer and photographer living in San Francisco.*

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1. You'll get confused and panic.
2. Your computer will blow up.
3. You'll blow up.
4. You're better off with an IBM warranty.
5. Drives without an IBM sticker don't work.

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Glossary

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Half-height. Just what it says. A skinny disk drive that works just as well as a regular one. You can put two of them into one drive slot in the PC.

Double-sided (DS). A double-sided disk drive can read data from, and write data to, both sides of the disk.

Double-density (DD). The tracks on double-density disks are twice as close together as the original microcomputer floppies. (Someday they could be 20 times closer together and we'll have double-deco density disks. And then, of course, there are art deco disks—the square disks in the round jackets. . .) The important thing is that all IBM floppy drives, and all our drives, run double-sided double-density disks now.

Drive controller. a.k.a. drive adapter, IBM diskette adapter. You have to buy a special circuit board to boss that drive around on the PC. We sell floppy drive controllers. IBM sells them. Ours are less expensive and your computer will never know the difference.

Raw drive. A drive that doesn't know what it's doing, or where it belongs, or how to talk to disks or computers, or anything a self-respecting drive should know

Configure. To set up a raw drive so it knows what kind of computer it's inside of, and which drive it is (A drive, B drive etc.). We do it for you.

Pluggable terminator module. A small chip-type gadget on every drive. Take it off and the drive is a B drive. Leave it on and it's an A drive.

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DIP switches. a.k.a. dual in-line package switches. When you set these switches on the motherboard correctly it understands what's hooked up to it. All you need is a ball point pen and the illustrations we send with your drive.

DOS. a.k.a. disk operating system. Rhymes with "sauce". Blank disks are not very smart. They don't know how to be disks, or how to act around different computers. They worship this one disk called DOS. A DOS disk knows just about everything there is to know about being a disk and will gladly share that wisdom with any blank disk.

Format. You format a blank disk by putting your DOS disk in one drive and a blank disk in the other.

Spindle speed test. We test the spindle speed of all drives and get a readout within ±0.1 RPM

Random sector read test. Then we write data to certain locations and send the read head out after it. Your basic search and locate mission test.

Centering test. Floppies can flop but not wobble. This test makes sure your disk gets centered when you load it.

Radial test. A double-sided drive has two heads. This test checks their alignment

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2. A full-height floppy/two half-heights.
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4. Four half-height floppies.
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6. A full-height floppy/a full-height hard.
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$200 in ten minutes with our and a screwdriver."

—DAVID HALL, C.E.O.
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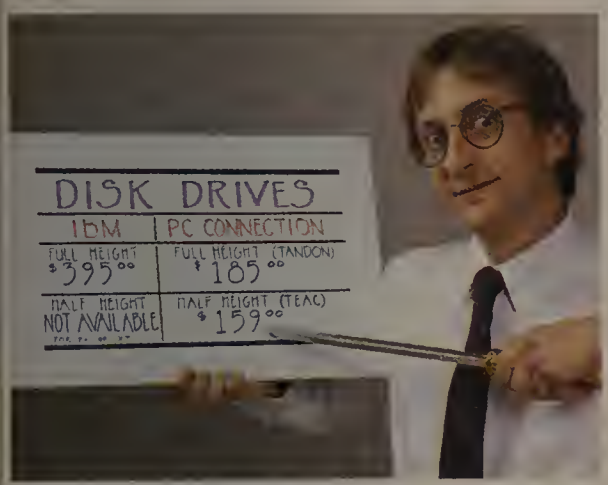

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Every Maynard package also comes with a ROM chip which plugs directly into an empty socket on the 256K motherboard. *This allows your PC to behave just like an XT, when running DOS based programs.* PC's with a 256K motherboard can boot off the hard drive. PC's with 64K must boot off a floppy first.

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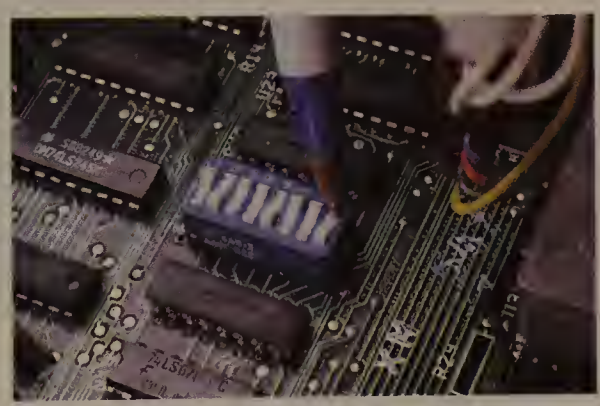

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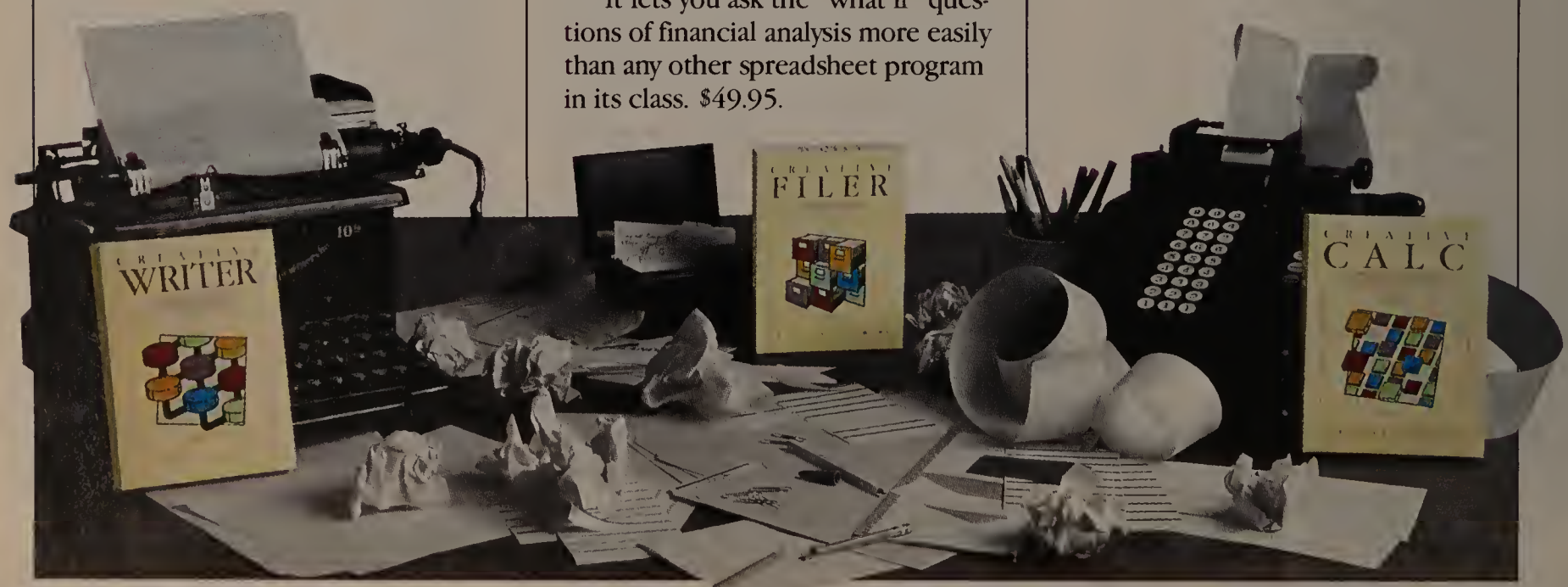

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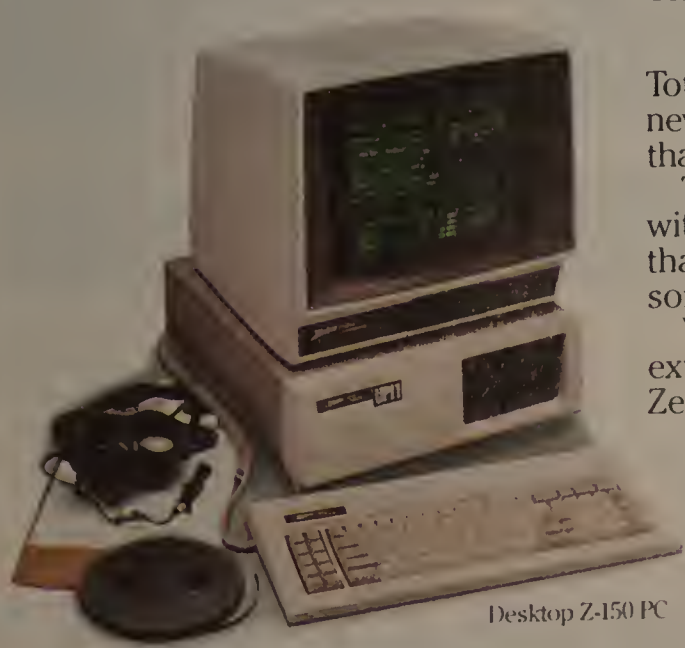
When a big story breaks, you'll hear about it faster thanks to the new UPI 1 Computer System, which utilizes the Zenith Z-150 PC as its central hardware component. UPI chose the Zenith Z-150 only after testing and even "roughing up" dozens of leading microcomputers, because it delivers the total performance that helps radio and TV stations report the news as quickly and accurately as possible.

WHEN TOTAL PERFORMANCE IS THE ONLY OPTION.

The IBM PC-Compatible Zenith Z-100 PC's.



Desktop Z-150 PC

Total performance. It's a must for United Press International, in reporting news that changes the face of the world. And for you, in handling information that changes the face of your business.

The IBM PC-compatible Zenith Z-100 PC's deliver that total performance, with enhanced features that include greater internal expandability. Storage that can expand up to 11 megabytes. The ability to run virtually all IBM PC software. A detached keyboard with a "smarter" key layout. And much more.

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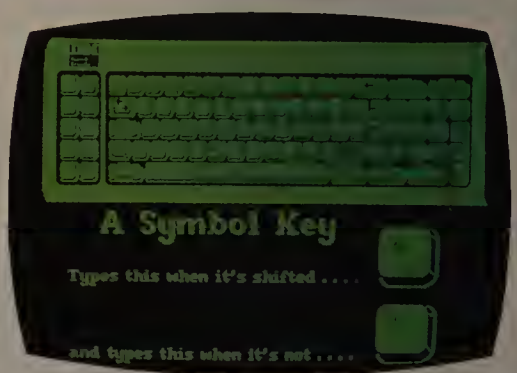
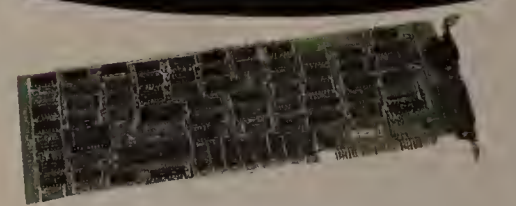
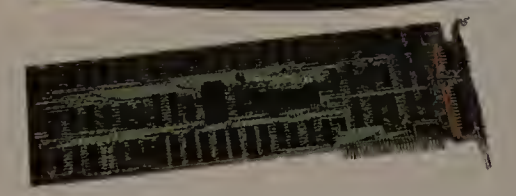
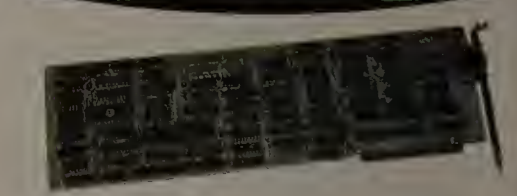




The Hercules Graphics Card™ $499



The IBM® Monochrome Adapter $250



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Number 1 in word charts for presentations and reports

Create powerful headlines using SIGN-MASTER's color, size, and font options. Here we chose Bold Roman font.

Highlight a single character, word or an entire line at the touch of a button. Here we focus attention on one number with color and underline.

Indicate source, date, author, etc. with SIGN-MASTER's footnote option. Bold Standard font was used in this example.

THE BOTTOM LINE
PROJECTED EARNINGS
(Millions of $)

	'78	'79	'80	'81	'82
Sales	86.4	121.0	144.0	163.8	182.0
Net Income	5.9	8.8	11.4	13.4	15.7
ROS(%)	6.9	7.3	7.9	8.2	8.6
Mkt. Share	48%	61%	65%	71%	76%

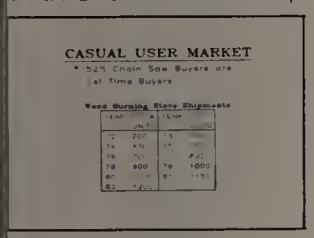
Capital expenditure required: $5 Million
Net present value = $24.25 Million
(opportunity cost of capital = 24%)

(Source: Annual Report)

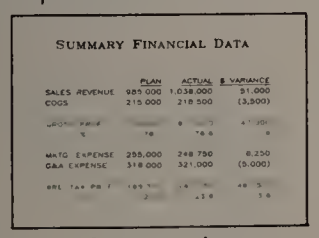
Develop professional tables quickly and easily. Once data and text is entered, SIGN-MASTER determines the spacing and layout.

Produce SIGN-MASTER word charts on paper, overheads or slides.

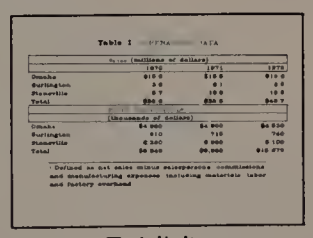
With SIGN-MASTER, the possibilities are limitless:



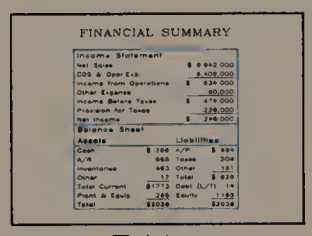
Proposals



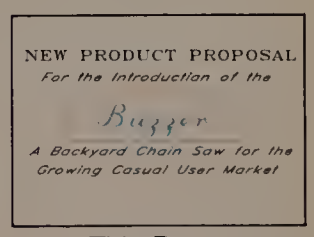
Summaries


Exhibits

Schedules



Tables



Title Pages

SIGN-MASTER is the first program designed to allow everyone from top management on down to produce colorful, attention-gaining "word charts" and tables for presentations and reports.

Created on a PC with a compatible plotter or printer, SIGN-MASTER word charts are superior in quality to typing and less expensive than typesetting or printing.

Professional Word Charts Made Easy

In just minutes, this unique menu-driven program lets you create impressive, easy-to-read documents using words, numbers, lines and SIGN-MASTER's simple-to-master Table Mode.

Number 1 in Quality Text

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An Important Presentation Tool

With SIGN-MASTER and any one of over 40 plotters, you can produce full color originals on paper and overheads. The program also works with over 10 printers to create the highest quality printer graphics available.

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For reports and presentations that get noticed, get SIGN-MASTER — Number 1 in word charts.

The retail price is $245.00. Call or write today for a complete information kit and a demonstration at your nearest dealer. Decision Resources, Inc., 25 Sylvan Road South, Westport, CT 06880 (203) 222-1974

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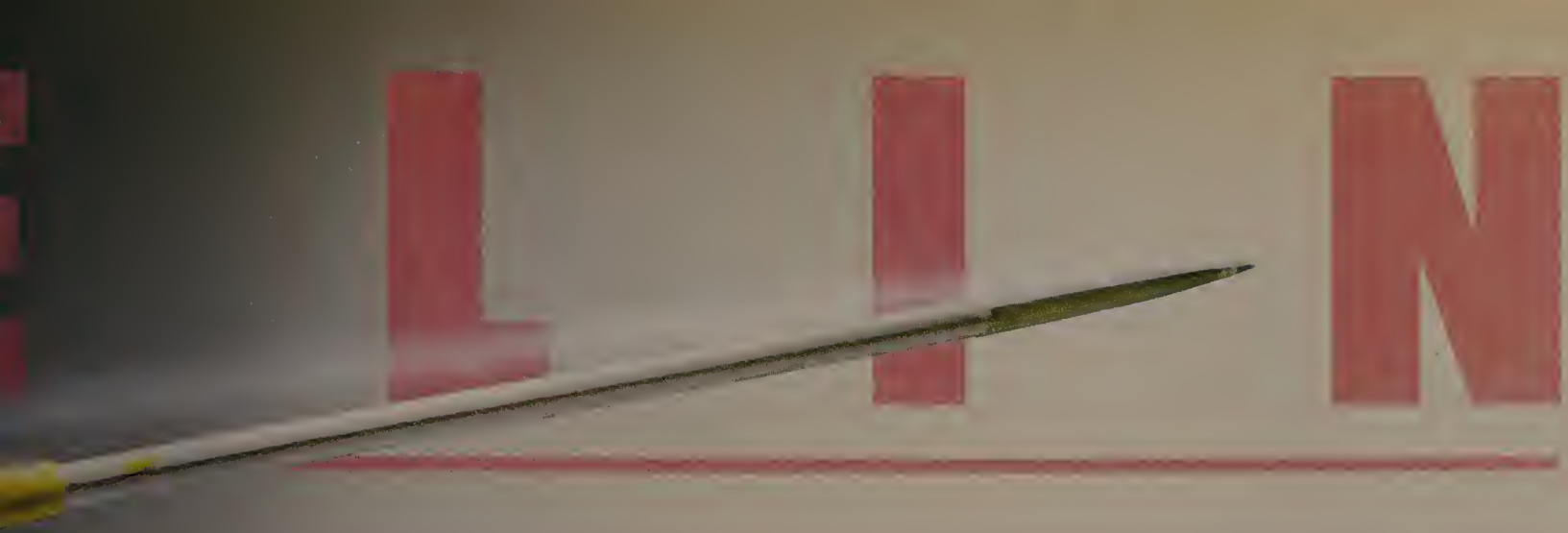

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Keep your options open for the future.
The SCSI* technology used in the Javelin offers easy future expansion. This technology also allows for backup and restore without CPU intervention — with special commands included in the controller.

Javelin's rigorous quality program.
Javelin's reliability, like that of every Emulex product, is built in and guaranteed. All active components are pre-aged. Subassemblies are cycled environmentally — under power, performing diagnostic tests and the total system is integrally tested.

The Small Computer System Interface (SCSI) is an interface standard that specifies the mechanical, electrical and functional requirements for a small computer I/O bus interface and command set for peripheral devices commonly used with small computers.

Javelin features a full range of utilities that allow for flexible expansion with minimal user intervention.

Call or write us for more information, or ask your dealer for a demonstration. Seeing Javelin in action is a breakthrough experience.

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Javelin is a product of Emulex Corporation, an industry leader in the development of high-performance controllers, communications products and packaged subsystems for PC's, micro, mini and super minicomputers.

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"Concrete just went up 20%!"

"The boss wants to make it blue."

If you're managing any kind of project today, you've got your hands full. Whether it's bringing a new product to market. Picking the best telephone system. Constructing an office building. Planning a convention. Or doing the annual report.

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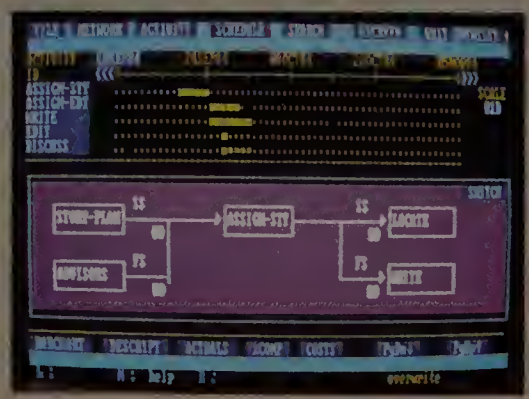

A picture of the project plan.

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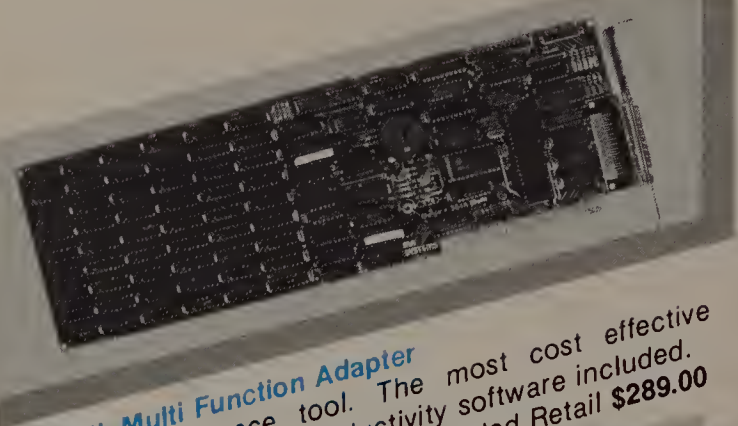

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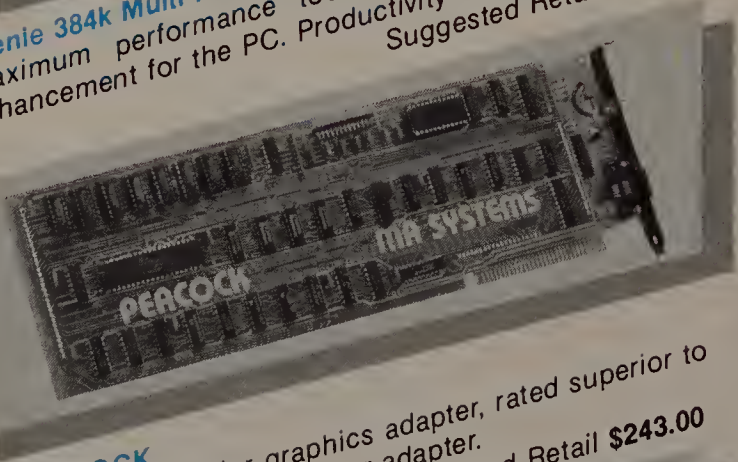

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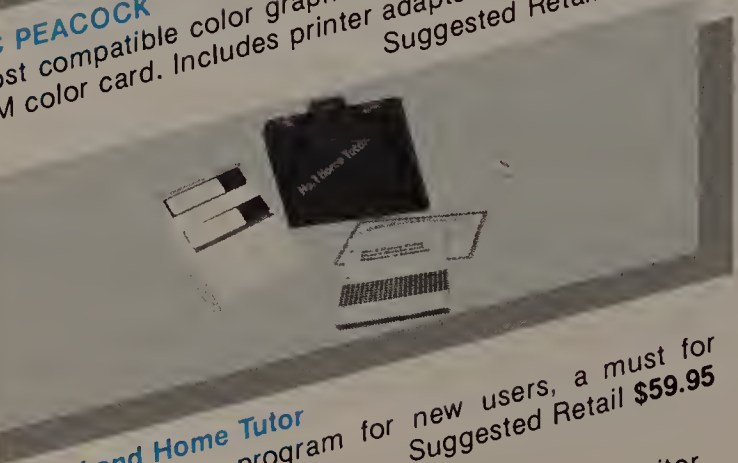

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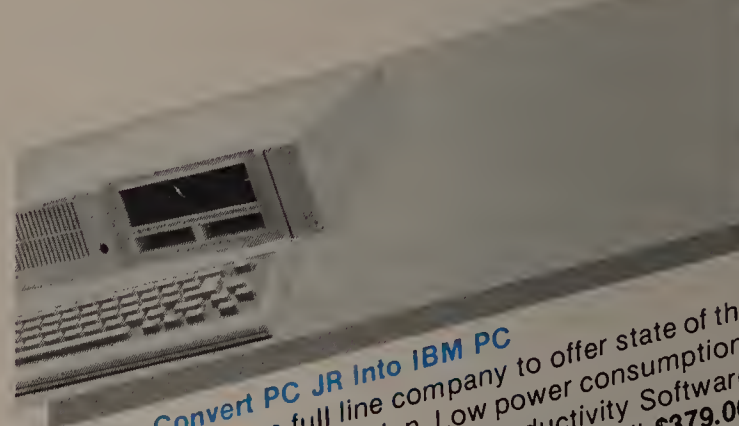

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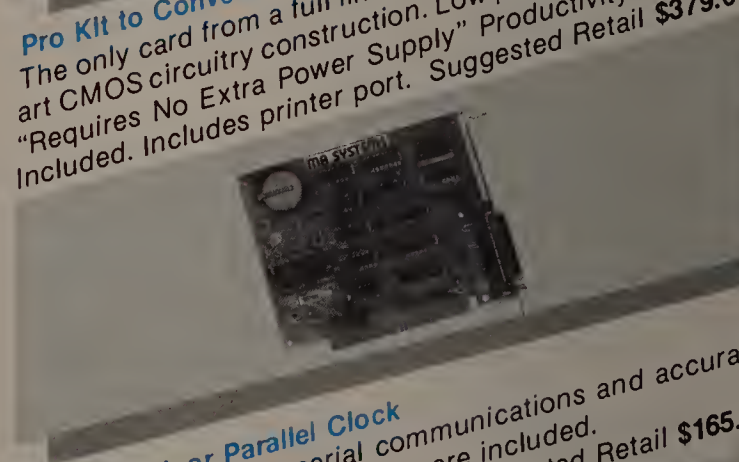

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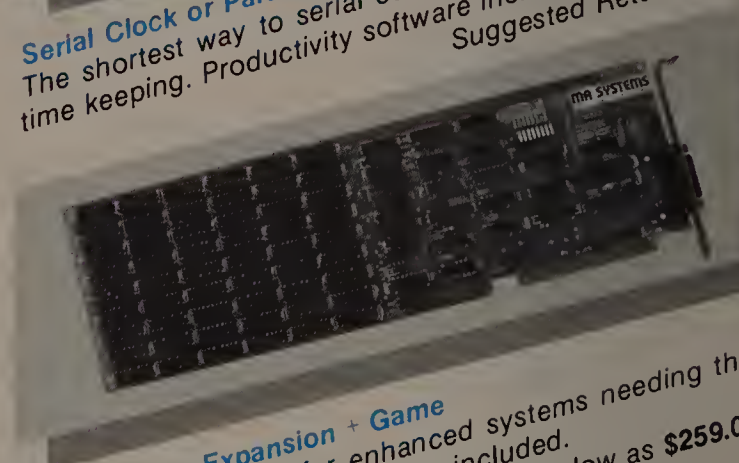

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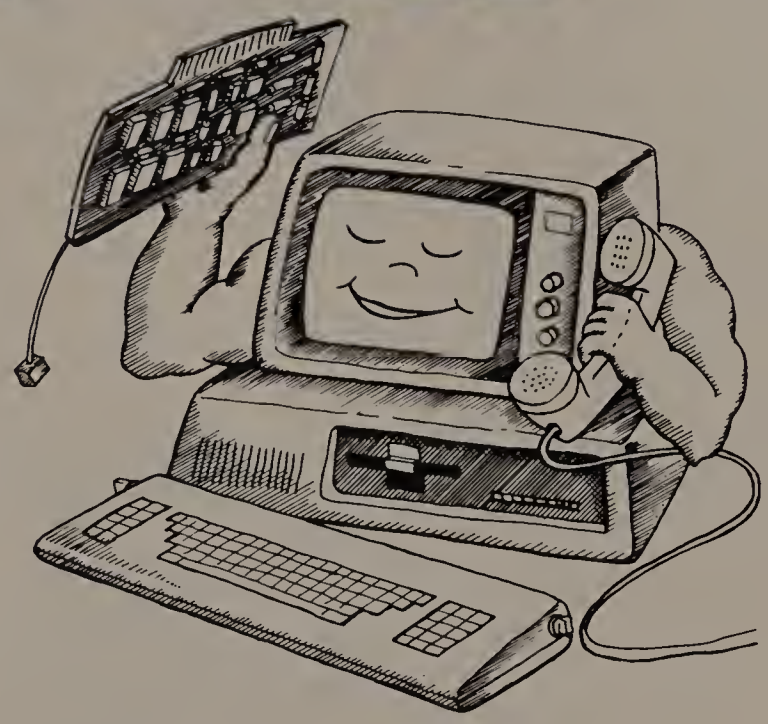

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Sources of Per Capita Income
(Constant 1980 Dollars)

	1980	1982	1984
Wages and Salary	68.2	64.2	64.2
Other Labor Income	4.2	5.2	6.2
Proprietors' Income	8.1	6.9	6.8
Rental Income	2.3	1.8	1.5
Dividends	2.9	2.5	2.7
Interest Income	8.0	9.2	9.5

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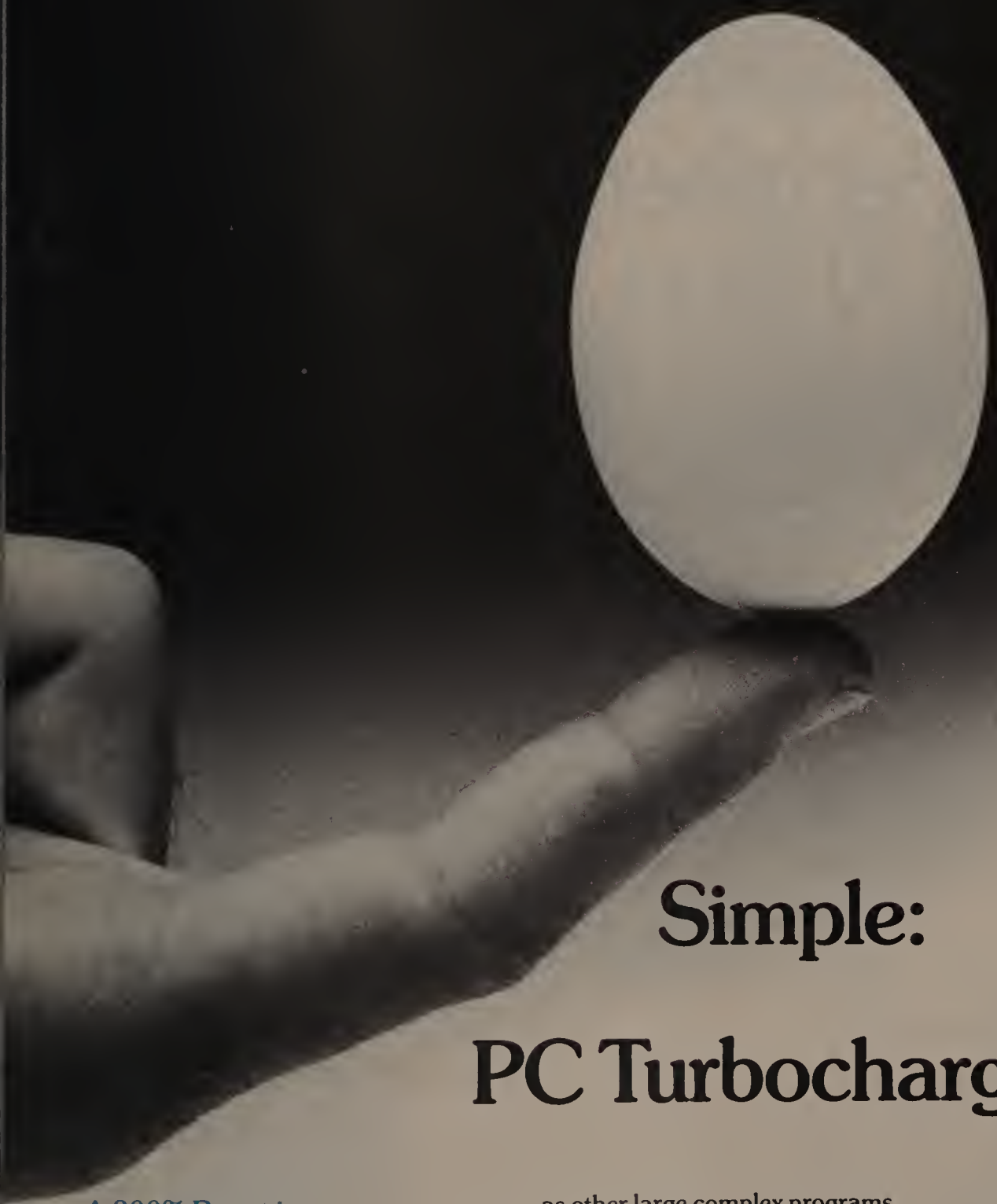

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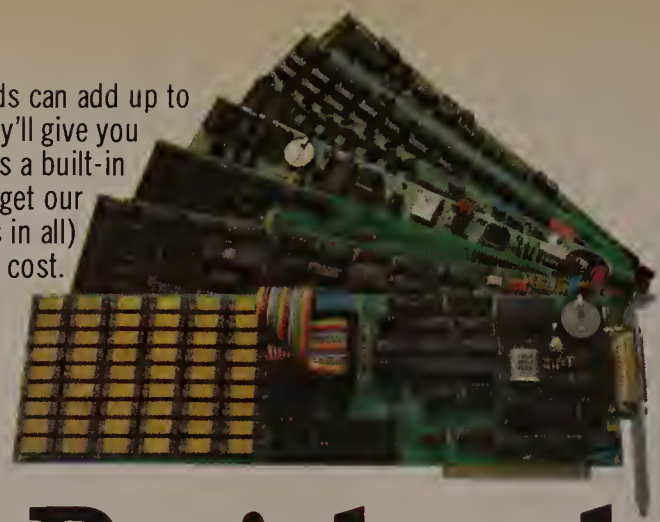

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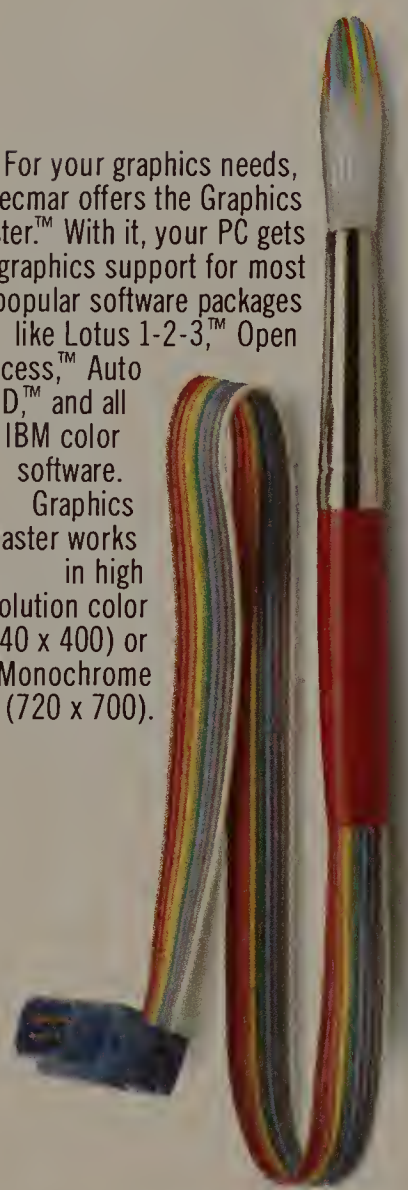

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The Ten-Second Commute

Working at home no longer means leaving big business behind. With the help of personal computers, a cottage industry could become multinational.

Anita Micossi

Once most people earned their livelihoods in and around the homestead. All able-bodied members of the household worked, and everyone's labor had a recognized economic value. Then the Industrial Revolution induced the great migration of labor out of the home and into the factory. After that, men went "out into the world" and were paid for their work, and women stayed at home and were not. One by one, "outside" institutions–schools, hospitals, social welfare agencies, police departments, recreation centers–took over the tasks of family and tribe, and the home became a refuge from economics instead of the economic center it had been.

The Industrial Revolution evolved into the information age, and the gathering and dispensing of information became a critical service. Then the personal computer was introduced. Because the computer is so adept at handling information, it's become increasingly important in the marketplace. Through communication with sources such as bulletin boards, mainframe computers, and commercial data bases, the personal computer can quickly gather data from around the world. This compact tool can do the repetitive work of many people, and, most significantly, it can do it all with you at the helm, close to your family and your coffee cup.

Working at home–the domain of the economically marginal ever since the Industrial Revolution–is suddenly attracting a whole new

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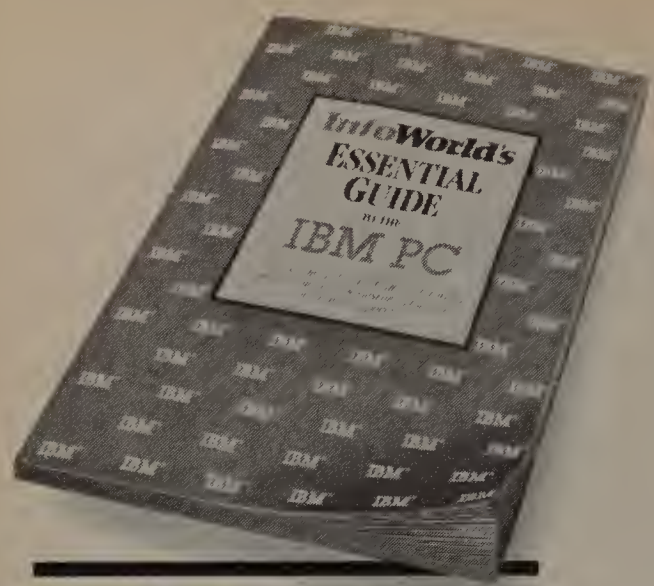

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group of people from an unprecedented variety of trades and professions. Five million Americans work at home, and this number is expected to double by the end of the decade, due largely to the personal computer.

There's much to be said about home computers and home-based work as individual topics. But the sparks really start to fly when you put them together.

The Road Home

Four years ago, Lucilla Barth was a high school teacher. Then she decided that there were more profits and fewer headaches in bookkeeping. After two years her freelance bookkeeping service, LDB Associates, expanded to the extent that she was spending most of her time away from home.

The mother of three teenagers, Barth decided it was time to make some adjustments. "I wanted to bring my work back home," she says, "and have flexible hours so that I could be with my children." She had little experience working at home and was a computer novice. But after playing with a friend's IBM PC, Barth bought her own and set up an office in her den.

Jessica Lipnack and Jeffrey Stamps were not computer novices when they brought their work home. In 1960 Stamps won a high school science fair prize for his homemade computer. The two met in 1968 at Oxford where Stamps was studying on a Fulbright Scholarship. Lipnack was a newspaper reporter. They married and, combining their skills in journalism and social science, set up an independent social research foundation.

Looking for a tool to help with a state-funded research project, Lipnack stumbled across the Sharp programmable calculator. It was 1970, and "they didn't call them computers in those days." She bullied the store manager into letting her buy the Sharp on credit. The calculator was followed in 1971 by a Wang 600 and later by a Wang 2200. In 1978 Lipnack and Stamps decided to move their work back home. Managing an outside office with a half dozen employees was eroding their productivity, and the two were expecting their first child.

Cameron Hall and Alex Randall haven't yet had time to start a family. The two have spent four of the last ten years trotting around the globe and putting their advanced degrees in economics and education to use—teaching, re-

Working at home is suddenly attracting a whole new group of people from an unprecedented variety of trades and professions.

searching, and hustling such "odd jobs" as producing a documentary on the green revolution in Thailand and conducting personal financial management seminars for the American military in Germany.

Randall has an unusual link with the computer revolution. While an anthropology student at Columbia University, he was urged by his tutor, Margaret Mead, to abandon the usual concerns of the anthropologist and take on "the whole planet" for study. Specifically, Mead introduced Randall to the concept of "appropriate technology," the use of knowledge for appropriate—that is, beneficial—purposes.

When Hall and Randall came to rest in Boston in 1981, they set up shop at home. They bought their first IBM PC to help with their writing and lecturing tasks. When they acquired the computer, Randall used it to publish a newsletter for the International Business Center of New England. But Randall knew that computers could do more than cut and paste text efficiently. His education and work abroad had taught him that "computers manage information better than people do" and that, as he puts it, computers are "developing the cortex of the world by electromechanical means." He became convinced that computers were the linchpin of the "appropriate technology" he had been searching for.

Late one night on the New Jersey Turnpike, it struck him that Boston had more computers per square mile than perhaps any

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other place in the world, and that the community turned them over at an incredible rate. Randall felt that such a stockpile of used computers could "fill that unfilled demand I had seen all over the world." His entrepreneurial instincts were engaged again, and the Boston Computer Exchange—a brokerage firm dealing in used hardware—was born.

Another computer-based home office is run by Dr. Herbert Greenwald, an experimental psychologist. Greenwald decided 20 years ago that his family came first. Although he teaches at a nearby college, Greenwald has always spent most of his time in a small home office where he does research and runs a therapeutic practice.

Greenwald needed a tool to help him with writing, filing, and coding data from patient interviews and questionnaires. He bought his first computer, a Seequa Chameleon, in 1983 for word processing and data management. Greenwald hopes to use the computer and his word processing, spreadsheet, and data base management software to map the psychological profiles of his patients and to develop programs to detect and analyze patterns. The potential for computer application to his therapeutic practice is, he feels, limitless.

It's hard to break emotionally and psychologically from work and flee to the refuge of home when the two are in the same place.

The Productivity Effect

In the first six months after the PC was installed in her home in San Rafael, California, Lucilla Barth's income doubled while her work hours remained the same. The computer enables her to offer her clients far more than a standard financial statement. "We coordinate, consolidate, and advise," she explains. "One company had hired three different people to take care of billing, routine bookkeeping chores, and complex financial reports. Now LDB Associates can do it all for them at a savings of $700 a month."

Barth's experience—being able to do more work in less time—is typical. Jessica Lipnack and Jeffrey Stamps use *Mist+*, an integrated word processing, data base management, and telecommunications package from New Era Technologies. "We can have an idea," says Lipnack, "and get an article out the same day." Since the copy can go directly to the typesetter's computer, a whole phase of labor is also cut out.

With little more than two people, three phones, and a half-dozen computers in a living room, Alex Randall's computer brokerage business went from con-

ception to profitable operation in a matter of months. Originally confined to matching computer buyers with sellers in the Boston area, the Boston Computer Exchange is ready to go national after less than a year.

The speed and accuracy with which computers crunch numbers increases the quantity of the work accomplished. But the real marvel, according to Herbert Greenwald, is the way the technology enhances the quality of effort. Greenwald claims that "the computer opens up the possibility of new solutions while helping to clarify my ideas and make them more concrete. As a result my thinking has improved."

Networking

The computer has helped Barth and Greenwald discover new paths in their traditional occupations and has allowed them to pursue those paths at home. But for Randall and Hall and Lipnack and Stamps, computers not only facilitate their work—computers make their work possible.

After Lipnack and Stamps moved their work home, they wrote *Networking* (Doubleday, New York, 1982), the first definitive book on networking—a concept cited in John Naisbitt's best-selling book *Megatrends* as one of the ten most important trends that are restructuring the way we live. It's a term familiar to PC users. Now Lipnack and Stamps (and five personal computers) run The Networking Institute out of their suburban home, publishing a newsletter, lecturing, organizing seminars, overseeing international

Managers know that a critical decision is only as timely as the information that goes into making it. The promise of personal computers has always been to deliver information to corporate managers in time to act upon it.

Only one software company can make a claim for integrating the two things that deliver that promise: the mainframe, from which all information flows, and the microcomputer, where someone has to make sense of that information.

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translations of their book, and generally exploring the concept of networking.

In its broadest sense, a network consists of the lines of communication that link people who have common interests. The Greenpeace movement is a network; international terrorist organizations form a network; and your circle of friends and family is a network.

Networks and personal computers complement each other perfectly. Computers allow the exchange of information that creates networks, through a medium that is potentially accessible to everyone. Such networks replace physical communities with communities of shared ideas and values, cutting across such barriers as age, income, and distance. Lipnack and Stamps are convinced that as private citizens gain access to ever-widening pools of information, networks linked by PCs will become Davids challenging the Goliaths of centralized, concentrated power. "You can't see our importance and social impact just by looking at this office," says Stamps, waving his hand across a homemade worktable. "But with computers people can play a profound role in the world while working out of their homes. In the information age, growth is accomplished via networking, and that's not limited by physical location."

For such a modest organization, Lipnack and Stamps are making lots of waves, socially and politically—their book is being published by the Japanese government this year. They're also making a good living.

A PC on the Hearth

For many people who've moved their work home and automated it with a PC, the increase in productivity has been greater than they ever imagined. But finances were not the only reason they moved home. For many the real payoff is a personal one.

In Barth's household the family is rediscovering togetherness around—of all things—a computerized bookkeeping business. Barth explains, "I have a thriving business where I can be available to my kids; they like having me at home when they get back from school. Also, I can get up in the morning and go to work in my bathrobe. And when I get all dressed up and go out, I can enjoy those challenging meetings with my clients. I've really got the best of both worlds."

The computer has had more of an impact on the family than just letting the kids see more of their mother. The kids are taking to the business too. "We have a deal," says Barth. "If they each take one year of typing and one year of computer science in high school, I've promised to hire them on to do some of the data input." Her oldest son, John, has taken up the offer. He's decided to study accounting in college and get into the business in a serious way.

Greenwald has always kept his office door open to his family. Since he bought a computer, however, the foot traffic has picked up. His sons use the machine for

homework and games, and sometimes father and son find themselves side by side at the PC grappling with a problem.

Although the daughters of Lipnack and Stamps are a bit young to work with their folks, they weave in and out of their parents' daily lives, popping in to show off a drawing or deliver a cup of tea. Lipnack likes that. "Unlike other working mothers, I know what my children are doing. And," she adds, "I didn't have to go through the heartbreak of leaving a new baby at home to return to work." For Stamps the ability to be around his family all day has been an unanticipated bonus. He says that, like most fathers, "I never thought I'd be able to work and be around the kids."

Second Thoughts

Of course, every situation has its drawbacks. Working at home can be socially and professionally isolating; professional connections are harder to make when you don't congregate with your colleagues at a common place of work. Also, it's hard to break emotionally and psychologically from work and flee to the refuge of home when the two are in the same place. There's also the economic risk. Maintaining an aura of professionalism is a potential problem for the home-based worker. Lipnack quips, "It's hard to get venture capital when you work at home."

But the people who have chosen to work at home play down the problems and risks—or even turn them into advantages. Hall contends that in many professions the

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GOLDENGATE's superior functionality results from its unique architecture. Each function in the program is designed to provide an optimum working environment. And each is linked to the others through core software.

The result is integrated pc software that does each of its jobs exceptionally well, so you can do the same in yours.

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Practical Advice for Would-Be Pioneers

If you're thinking about setting up a computerized cottage business, first consider whether or not your work can be done at home, either by yourself or with a skeleton crew. Make a fair examination of your conscience: Am I self-motivated? Self-disciplined? Am I capable of giving myself deadlines and meeting them? Am I flexible and good at juggling tasks? Am I willing to take risks?

Finally ask, Do I really want to live this way? The quality of life comes first with the people I talked to. Although they are doing fine financially, there are less risky ways of making money.

Working at home is not for everyone. But if you have the temperament for it, then listen to the advice of the advance guard:

1. When purchasing hardware, choose a reputable dealer. What to buy depends, of course, on how much money you've got and what you're going to use the computer for. Herbert Greenwald's Seequa Chameleon with a dot matrix printer and bundled software cost him around $3500. The Lipnack/Stamps' arsenal of printers and five computers, including an IBM PC, a Vector IV, and a Kaypro (all of which talk to each other), cost more than $25,000.

When buying a computer, anticipate expansion and make sure that the hardware (and software) can grow with you. And make sure you get a surge protector. The home, unlike the conventional office, has lots of high-pull appliances—a clothes dryer, a vacuum cleaner, a well pump, and so forth—that come on and off during the day.

2. Software is the weak link in most home business systems. Seven months after Greenwald bought his computer, the Condor data base software (included in the purchase price) had still not arrived. It took Barth over six months to get her billing program, the *Advocate,* up and running. Hall and Randall found a data base package to love in Alpha Software's *Data Base Manager II,* but not until they'd gone through torture with *dBASE II. dBASE II* is not recommended for the beginner unless you budget the price of a consultant into start-up costs.

Lipnack and Stamps first selected the software best suited to their needs: the *Mist+* package, a text-oriented data base manager with word processing and telecommunicating capabilities. Only then did they buy the hardware. Significantly, they are the only interviewees who have no complaints.

3. Make sure you have a work space in your home that is physically separate from the rest of the house. This is important both for privacy and professionalism while you're working and for

escaping when the workday is done. Being able to shut the door to your office is important.

I was amazed to see Randall and Hall's apartment, where there was virtually no place free of business paraphernalia except the bathroom. How do they survive? A second house in Rhode Island.

4. Don't leave social and psychological breaks from work to chance. Plan activities that take you away from and give you perspective on the work.

Schedule family recreation time and, if you have children, separate time to spend with only your spouse. Lipnack and Stamps make "dates" with each other. Going out for meals and entertainment, traveling, and trading houses with someone who wants to play with a computer for a while were all suggested ploys.

5. Create a strong social network or nurture the one you have. Isolation is a major problem for single individuals working at home.

Lipnack points out that here also you can turn the technology to your advantage: use the computer to plug into networks of like-minded souls—location is no barrier to this new-age method of communication.

6. If you don't have any on-the-job contact—either with a spouse or with someone you've hired—develop alternative methods of professional exchange. It's important to be able to get feedback from and share ideas with colleagues. One way is through professional associations or regular meetings with clients.

mystique surrounding people who use computers offsets the disadvantages of an otherwise "nonprofessional" image. And Greenwald finds that in his profession "patients actually prefer to come to a home."

For 150 years work and home have been competing with each other. Now computers are making it easier to blend the two and increase the satisfactions of both.

The pioneers who are reversing the great migration often experience more than a seemingly idyllic "lifestyle." Many start out with modest goals. But after working with computers and controlling their own lives, their goals expand in unpredicted directions. The Barths would now like to help other small businesses through the process of conversion to computers. Greenwald wants to create software that maps the human psyche. Lipnack and Stamps want to be instrumental in the creation of global networks based on computer technology. Randall and Hall—who believe that "computers extend the mind the way telescopes extend the eye"—do not confine their activities to running the computer exchange. They hope to spread the word about this "appropriate technology" worldwide.

Will these pioneers have any impact on life outside their own cozy, computerized cottages? If Jeffrey Stamps is right, their influence will be greater than their numbers. And their numbers bear watching.

Anita Micossi is a Boston-based writer and sociologist.

Pssst. It's

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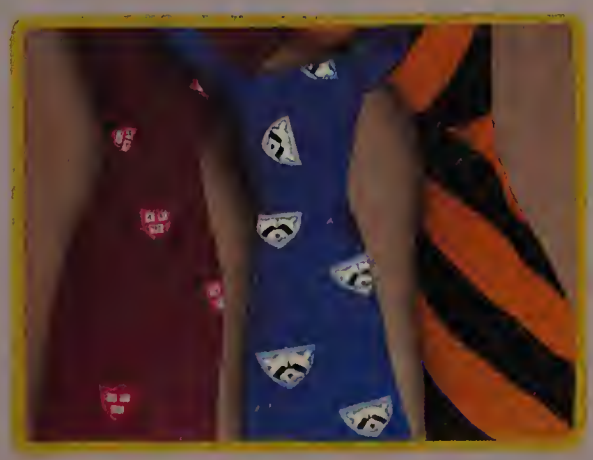

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Over at Jr. CONNECTION, our consultants are pretty enthusiastic about IBM's relaunch of its not-so-pretty-at-first baby. New keyboard. Expanded memory potential. Admittedly, it's stuff we've been offering from non-IBM sources for months now. But the exciting thing is that IBM's new commitment will translate into a greater variety of hardware and software from third party vendors.

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Compatibles Update

The latest developments in the PC-compatibles marketplace

Laptops are bursting out all over as Data General unveils the DG One, a full-screen "mobile" PC compatible, and Osborne Computer hails its comeback with a familiar portable.

Ken Greenberg

Compatibles Update keeps tabs on the growing market of personal computers that emulate the IBM standard. The column features news on hardware and software as well as insights into the legal and business issues that affect compatibility.

Trends

The Shrinking of a New Machine

Although some industry analysts suggest that the world doesn't need another laptop computer, Data General (DG) is convinced that it has a winner in the 10-pound Data General One (DG One).

DG has ushered in the machine with the finesse befitting an increasingly cautious marketplace. The DG One offers PC compatibility, but it is not touted as a clone; it is genuinely portable, but its maker prefers to call it mobile.

Like the PC itself, the DG One represents a triumph of both packaging and technology. The packaging in this case is provided by Nippon Data General, a Japanese-based subsidiary. By tapping its Japanese pipeline, DG has released a machine that sports internal disk drives and a 25-line display, which the company says are enough to give it at least a six-month lead in the laptop market. The Japanese connection is critical for DG, because Japan is currently the primary source of 25-line liquid crystal displays (LCDs). A full-size LCD—perhaps the DG One's most salient feature—is akin to the Holy Grail in the laptop world.

DG may be hoping that any resemblance to Hewlett-Packard's 110—a 9-pounder that features a 16-line LCD and 384K of software in ROM but lacks internal disk drives—is to its advantage. With its highly readable, nonglare LCD, bit-mapped graphics, and compartments for two 3½-inch 720K floppy disk drives, the DG One is closer to the Morrow Pivot (or the Osborne 3; see next item), which boasts 5¼-inch disk drives and a 16-line LCD, with room for 25.

The DG One offering is built around the 80C88, a CMOS version of the PC's 8088 microprocessor, and relies on energy-efficient CMOS technology throughout. The DG One's nickel-cadmium batteries can last eight to ten hours on a single charge. What the unit's 3½-inch 720K floppies lack in interchangeability with 5¼-inch-based PC software, they may make up for in availability and storage capacity. The DG One uses the same Sony microfloppies as Apple's Macintosh. An expansion unit housing a 5¼-inch floppy disk drive easily handles the larger floppy disk. Other specifications on the DG One include 128K of RAM expandable to 512K, two serial ports (the machine does not include a parallel printer port), and an optional 300-bps or 1200-bps modem.

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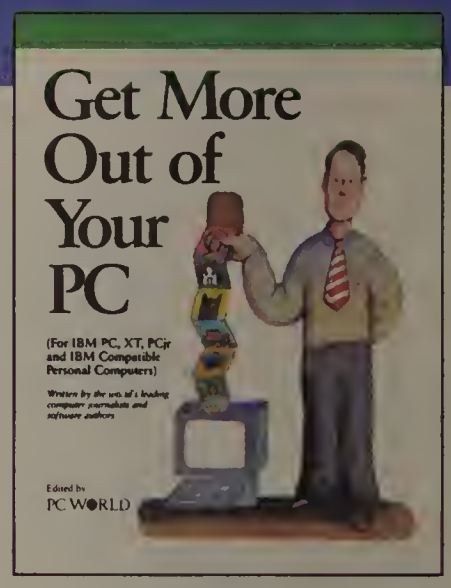

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1 PC WORLD J12D023

The DG One sports internal 3½ floppy disk drives and a full 25-line screen.

DG is marketing the DG One as a "successor product" to its 8086-based Desktop Generation multiuser system. In this case the upstart will have ample opportunity to converse with its predecessor (as well as with other machines in the DG lineup) via the DG One's file transfer capabilities and ROM-based terminal emulation software.

Although the DG One may not be promoted as a PC clone, it behaves suspiciously like one. During a demonstration at *PC World,* the DG One sailed through a battery of tests for PC compatibility. The machine ran *Flight Simulator* in both 3½- and 5¼-inch formats and exhibited surprisingly crisp animation. The unit had no trouble running PC-DOS 1.00 and 2.00, GW BASIC, *WordStar 3.3, dBASE II, Microsoft Word,* and Verbatim's *Disk Drive Analyzer.* DG claims that the DG One will run all of the hits on Softsel's Top 20 off the shelf, with the exception of *1-2-3,* which in order to print must be modified to use the DG One's serial port.

PC compatibility aside, the portable-computer marketplace has been unsteady at best. Among the transportables—the machines that build biceps—the Portable PC has apparently scored something less than a knockout. The Compaq portable continues to outsell IBM's by as much as 4 to 1. Among the truly portable, not much is moving. Convergent Technologies' WorkSlate has been shelved, and Xerox has abandoned its machine. Gavilan has not only delayed its product release but also laid off staff. Kaypro's proposed deal with Mitsui for an MS-DOS laptop appears moribund. Visual slashed prices on its PC-compatible Commuter. Even Tandy has trimmed prices on its popular Radio Shack Model 100. The HP 110 has been well received, but price/performance questions continue to plague the machine; whether vast numbers of consumers will plunk down $3000 for what is usually a second computer is questionable. At press time, DG was considering pricing its machine "somewhat" below the $3000 mark.

The business world's appetite for portable computers may be uncertain, but DG—anything but a skittish company—has presumably seen the handwriting on the analysts' wall. InfoCorp predicts robust sales for full-function portable computers (such as the DG One and the HP 110) during the next few years. According to that market research firm, the installed base of hand-held computers (such as the Radio Shack Model 100) will exceed 2 million by the end of 1984, compared with 408,000 portables and nearly 1 million transportables (such as the Compaq). The "truly portable" variety

will be dominant by 1989, with an estimated 7.8 million units installed, compared with 5 million hand-held and 6.3 million transportable units.

Such a growth path fits DG, a New England version of Apple. The company is spirited, aggressive, and, in the minicomputer business, committed to playing Avis to DEC's Hertz. The company also boasts a cadre of scrappy characters, who are celebrated in Tracy Kidder's Pulitzer Prize-winning book, *The Soul of a New Machine* (Avon, New York, 1982).

For Desktop division marketing vice president Herb Shanzer, purveying portables requires taking a different slant on the market than DG has as a minicomputer vendor. "IBM changed its corporate personality to make the PC succeed," Shanzer opines. "Minicomputer vendors have gone after the PC market without the radical mentality change you need to be successful." DG executives believe that turning out another PC clone is a recipe for being left alone in the marketplace. "We're aiming at those who seek PC functionality and also value mobility," says Shanzer. "We've made no compromises in power to get mobility."

Part of the "radical mentality change" are big ad budgets, splashy TV campaigns, and learning to live with retail sales—a shift that was not easy for DEC. "This is a volume, retail channel product," Shanzer says. He predicts "a spillover in awareness" of DG's entire Desktop Generation line, currently available through only 125 retail outlets. "This is much more involvement in the consumer market than we've ever had," Shanzer says enthusiastically. Welcome to the party.

Born-Again Osborne Turns Compatible

Osborne Computer Corporation is currently drafting required reading for the personal computer industry. That opus, when completed, will bear a title something like "How to Survive Chapter 11 and Create a New Kind of Computer Company."

Emerging from bankruptcy protection less than 11 months after its fall, Osborne is no longer in the proprietary computer business. The company is billing itself as a "generic" computer firm—a trading company that buys and sells products and adds value. In an economy that is often unforgiving, Osborne has won a second chance.

The company has changed virtually everything but its name. During the summer, Osborne left its Hayward, California, home—scene of both boom and bust—for smaller quarters just down the road in Fremont. Stocks of the famed Osborne 1 are dwindling, and most spare parts have been auctioned off. The firm now supports a payroll of about 35, and morale seems high. Osborne has managed to hang on to 38 distributors in 80 countries, and the more than 100,000 Osborne owners continue to receive service. Even the *Portable Companion* magazine has resumed publication after a hiatus of several months.

Osborne's fiscal blueprint consists of a 15-month plan to wipe out indebtedness of somewhere between $9 million and $15 million, down from $40 million in September 1983. Fully 93 percent of the company's 200 voting creditors approved the reorganization plan. Osborne, according to President Ronald Brown, now shops for manufacturers capable of producing its designs "cheaply and well" and then markets those products overseas. At press time, the firm was planning to raise $3.3 million in capital for research and development via a public offering at $1 per share—an offering open only to California residents and foreign nationals.

The Osborne 3, otherwise known as the Morrow Pivot

The big news is that the born-again company's first entry is highly PC compatible. Lack of compatibility, as you may recall, was partially responsible for ushering the firm into bankruptcy court. Osborne learned the hard way a lesson that many compatible makers may have yet to learn: if you're going to sell a PC work-alike, make it interesting.

Enter the Osborne 3, a computer that Ron Brown calls "ultra-portable." It bears an uncanny resemblance to the Morrow Pivot (which isn't surprising because they're essentially the same computer). The machine–a nifty 9-pounder with a CMOS 8086 microprocessor, a 16-line LCD, two ⅓-height 5¼-inch floppy disk drives, and an internal modem–is the handiwork of Vadem Corporation, the Silicon Valley firm that designed the product and licensed it to both Morrow and Osborne. Vadem, in turn, has farmed out production to Selectron, an IBM and Apple subcontractor located in Santa Clara, California.

In a sense, the Osborne 3/Morrow Pivot is a hybrid of the two companies that now share it. Vadem founder Chikok Shing cut his teeth at both Osborne and Morrow as well as at Intel and DEC. Shing helped design both the Osborne 1 and the Osborne Executive.

Although Morrow has exclusive rights to sell the machine in the United States, Osborne will be marketing it overseas, and the twain don't figure to meet. The Osborne 3 (known as the Encore in the United Kingdom) was scheduled to make its debut in Western Europe, South Africa, and Australia this fall, with the Pacific Basin and Africa to follow. Software bundling–an Osborne innovation–is continuing, although programs are being added by distributors, not at the factory. At press time, the Osborne 3 was priced at $2500.

Still, Ron Brown is not prepared to make PC compatibility the cornerstone of Osborne's recovery. Brown, an 11-year veteran of IBM, has little enthusiasm for chasing Big Blue. That could be why there's only a "50 percent" chance that the company will move ahead with a prototype PC compatible called the Osborne PC. Preliminary specifications on the machine, which resembles an Osborne 1 but has an enlarged display, include an 8088 chip, a maximum 512K of RAM, 640 by 200 bit-mapped graphics, a reset button, and the Key Tronic keyboard.

Yesterday's Osborne was a presence in United States retail channels, but necessity and business strategy have made the firm go overseas this time–in some cases getting a jump on the American goliaths. "We're treating countries as vertical markets," Brown explains. Strategy also dictates supporting no more than three products at a time. New areas for Osborne are likely to include micro-to-mainframe communications and educational computing.

Whole Lotta Shakeout Goin' On

Summer's a fine time for vacations, and the summer of 1984 may be remembered for the head start on permanent vacations that it gave some PC-compatibles manufacturers.

The combination of IBM's price cuts and product introductions, AT&T's entry into the PC-compatibles arena, softening demand, and a glut of products spelled gloom even for strong players such as Compaq and Columbia Data Products. And gloom is spelled a number of ways, such as layoffs, fire sales, disappointed stockholders, and postponed plans.

Columbia surprised even itself as an expected $1.5 million quarterly gain became a $3.5 million loss. The company then deferred to later in the year revenue from $10 million in shipments to a major national distributor. The reversal has shaken investors and dealers, some of whom may be on the verge of dropping the Columbia line. In an attempt to right the corporate ship, Columbia laid off 35 percent of its work force at plants in Maryland and Puerto Rico.

TeleVideo Systems has hardly put all its chips in the PC-compatibles basket, and that may be just as well. Third-quarter corporate earnings took a nosedive, largely due to sluggish sales of the company's PC work-alikes. According

to some analysts, TeleVideo's lackluster performance reflects both distribution problems and a tardiness in embracing MS-DOS.

Despite a 20 percent gain in quarterly sales and a generally upbeat response to its Deskpro line of desktop PC compatibles, Compaq has been taking a few hits on Wall Street as well. Second-quarter earnings were flat, owing, the company says, to plant expansion and advertising commitments. Profit on sales of $66 million failed to top $1 million.

Beleaguered Eagle Computer continues its bid for solvency, an effort that may have found help in the person of Sam Goodman, Eagle's new chief financial officer. Goodman reportedly has a knack for turning around companies in dire financial straits (he did it for both Ampex Corporation and a division of W. R. Grace), and Eagle seems to be in that kind of trouble. Citing dismal sales, Tek Aids Industries, a large midwestern distributor, has dropped the entire Eagle line.

Eagle's latest executive office reshuffle witnessed the departure of cofounder Charles Kappenman and his replacement as chairman by company president Ronald Mickwee. Mickwee and his associates are working on a plan to restructure more than $9 million in unsecured debts. The company claims that half its creditors have endorsed the plan, short of the 85 percent needed to make the proposal binding. If the plan doesn't materialize, Eagle could strike an OEM deal with Sperry Corporation, although the computer giant has been leaning toward Corona Data Systems as the replacement for Mitsubishi Corporation, maker of the Sperry PC.

In view of all this hubbub, *The Coming Computer Industry Shakeout: Winners, Losers, and Survivors* (John Wiley & Sons, Inc., New York, 1984) proved appropriate summer reading. Stephen T. McClellan, an industry analyst for Morgan Stanley, has produced a literate and at times incisive book packed with lessons for PC-compatibles makers, owners, and potential buyers.

No business book is complete these days without a gimmick, and, alliterative contrivances aside, McClellan's eight *s*'s in "the new winning formula for computers" do compute: selling, service, software, smallness, specialization, style of management, stock financing, and systems compatibility.

McClellan places heaviest emphasis on the eighth: "The features that now sell a computer product, such as the amount of memory or the speed of the processing unit, will become secondary to whether or not the product can share data and communicate with other equipment. As the computer industry fragments, and new products blitz customers from all directions, systems compatibility, probably IBM compatibility, will be a prerequisite. A machine will not stand alone, out in the cold, unable to tie into other machines." Much of the book serves as validation of IBM's PC strategy and is replete with lessons for and by compatibles manufacturers.

Software

Software to Travel With

Traveling Software has released a pair of business productivity packages for the HP 110, Hewlett-Packard's 9-pound portable. New are the *Traveling Appointment Manager* and the *Traveling Project Manager*. The appointment manager automates schedules and lets you assign priorities to appointments. The project manager provides a system of project tracking, budgeting, and scheduling. Both programs feature windowing environments adapted to the 110's 16-line by 80-column LCD.

Also available for the 110 is a version of *Pertmaster*, Westminster Software's menu-driven critical path analysis package. *Pertmaster* relies on both activity-on-arrow and precedence networking techniques in scheduling as many as 500 activities at once.

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Baker's Dozen for Polo System

Thirteen accounting packages are currently available for Polo Microsystems' Polo System I personal computer. ADS Software has modified its line of accounting programs for the 80188/Z80-based machine. ADS modules include *Payroll, Accounts Receivable, Accounts Payable, Invoicing, General Ledger,* and *Inventory.* ADS also released seven vertical market packages: *Bookkeeping Services, Veterinarians Accounting, Church Financial Accounting, Standard Accounting, Private Membership Clubs, Retail Florists Accounting,* and *General Invoicing and Sales Accounting.* The Polo System I is bundled with *SuperWriter, SuperCalc 3, pfs:file, pfs:report, Finance Manager,* and *Crosstalk.*

Seequa Unveils Hot Utility

In an effort to domesticate some of the traditionally unfriendly traits of MS-DOS, Seequa Computer has released *Seequa Exec,* a shell around MS-DOS that the company claims eliminates the need to master the operating system. *Seequa Exec,* available for the Seequa XT and other PC-compatible hard disk machines, rolls utility and operating system commands into a single package.

Have a Blast With TI . . .

The Communications Research Group has unveiled a version of *BLAST* (blocked asynchronous transmission) software for the TI Professional. *BLAST* offers bidirectional file transfers between dissimilar machines equipped with the *BLAST* package. The program is currently available for some 60 configurations of personal computers, minicomputers, and mainframes.

. . . or Become an Expert

Software developers can use the TI Professional to design expert systems now that Texas Instruments has released the *Personal Consultant* for that machine. Relying on window management techniques and English-language commands, the package permits prototyping and the development of sophisticated commercial applications. Expert systems created with the program can include up to 400 production rules (statements that determine the program's steps).

Cdex Training Programs for DEC, TI

Cdex Corporation has developed training packages for the DEC Rainbow and TI Professional computers. Nine Cdex products are included in DEC's "Digital Classified Courseware" program, among them *Advanced Training for Lotus 1-2-3, Managing Your Business With Multiplan, Making Key Business Decisions With Multiplan,* and *Analyzing Financial Statements.* Cdex has begun shipping the packages and four additional training aids for the TI Professional, including *Training for WordStar* and *Training for dBASE II.*

Open Access for Corona Line

Software Products International has customized its *Open Access* integrated package for the Corona Data Systems line of PC-compatible portable and desktop units. The modified version of the software makes use of the 640- by 325-pixel and 640- by 400-pixel high-resolution graphics modes found on Corona machines. *Open Access* consolidates data management, spreadsheet, word processing, time management, telecommunications, and three-dimensional graphics functions.

Thinking of buying a modem? You owe it to yourself to check out the Qubie' 212A modems.

Inside Outside

Just a few years ago, computers needed big air-conditioned rooms to operate in, balefuls of money to buy, and a team of wizards to keep them running. The constant march of technological progress has given more and more powerful machines which cost less and less. Desktop computers more powerful than the early mainframe computers are the result of the evolution. The Qubie' modems represent the latest extension of this progress. Because up until now, a 212A compatible modem cost at least $500. Through the use of four low-cost, state of the art microprocessors, we can now offer two versions of our full featured 212A modem at prices the competition sells 300 baud modems for.

In The Beginning

In September of 1983 we introduced the first 212A modem card for the IBM PC available for under $300. The PC212A/1200 is a complete communications package including PC-TALK III software, modular phone cable, card edge guide, and instruction manual. The modem is an auto-dial, auto-answer type, which uses all the Hayes software commands so it can be used with any of the popular software packages including Crosstalk,™ and Smartcom.™ We picked the best software package we could find based on it's ease of use and features, PC-TALK III. Our modem includes features the old industry standard missed out on. Like being able to fit in one slot in a Portable PC or PC/XT. Or an optional connector to use the modem's serial port when not using the modem. Of course the topper is the $299 price, hundreds less than the competition.

Now Available Outside

Our standalone modem, the 212E/1200 can be used with any computer or terminal with a RS-232C serial port. You can use any Hayes compatible communications software on anything from an Apple to a Zenith. Many owners of IBM PC's are using it because they lack available expansion slots, or have more than one computer they want to use their modem with.

It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

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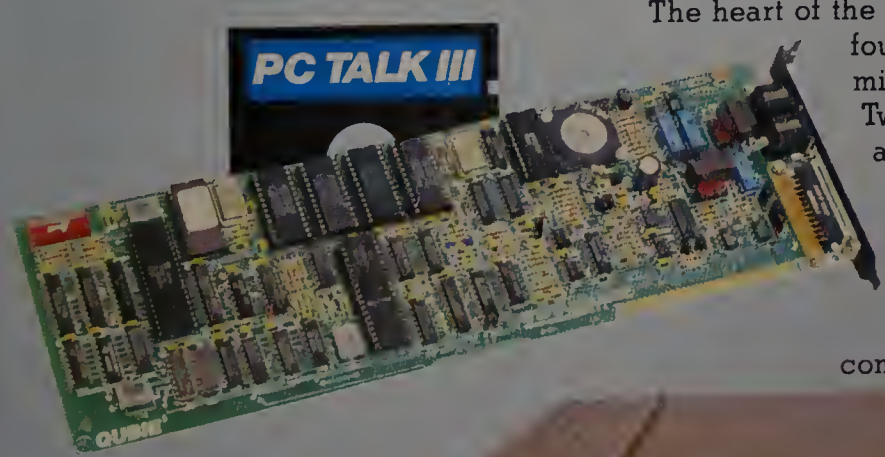

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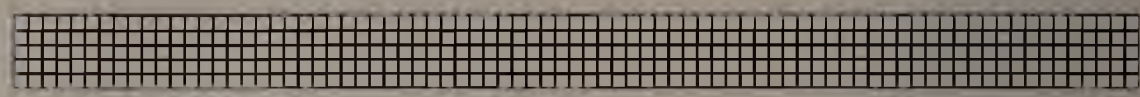

dBASE II for the 2000

Tandy Corporation is offering Ashton-Tate's *dBASE II* for the Tandy 2000, an 80186-based MS-DOS machine. Minimum configuration of the 2000 for the popular data management program is 256K and either a 10MB hard disk or two 720K floppy disks.

Profit Center Ready for Wang, TI

Prentice-Hall's *Profit Center* accounting series is available in versions for the TI Professional and Wang Professional computers. Modules include *General Accounting, Accounts Receivable, Accounts Payable, Business Word Processor, NEAT (Time and Information Manager),* and *Master Menu,* which integrates the modules.

AutoCAD Gains Support

Autodesk, maker of *AutoCAD* computer-aided drafting software, has released versions for the Eagle line of PC compatibles, the DEC Rainbow, and the TI Professional. *AutoCAD* provides precision drawing applications, including schematics, space planning, mechanical drafting, and graphics design.

Communicate With Sanyo

Computer Toolbox has unveiled *Intellicom* for the Sanyo 550/555 series of personal computers. The package permits file transfers and simple terminal emulation. The menu-driven package provides support for 300- and 1200-bps modems and automatic dialing from disk-based phone directories.

Compatibles Update *welcomes contributions from readers, and we'll pay up to $50 for the items we use. Please include your name, address, and phone number with your contributions. Send them to* Compatibles Update, PC World, *555 De Haro St., San Francisco, CA 94107.*

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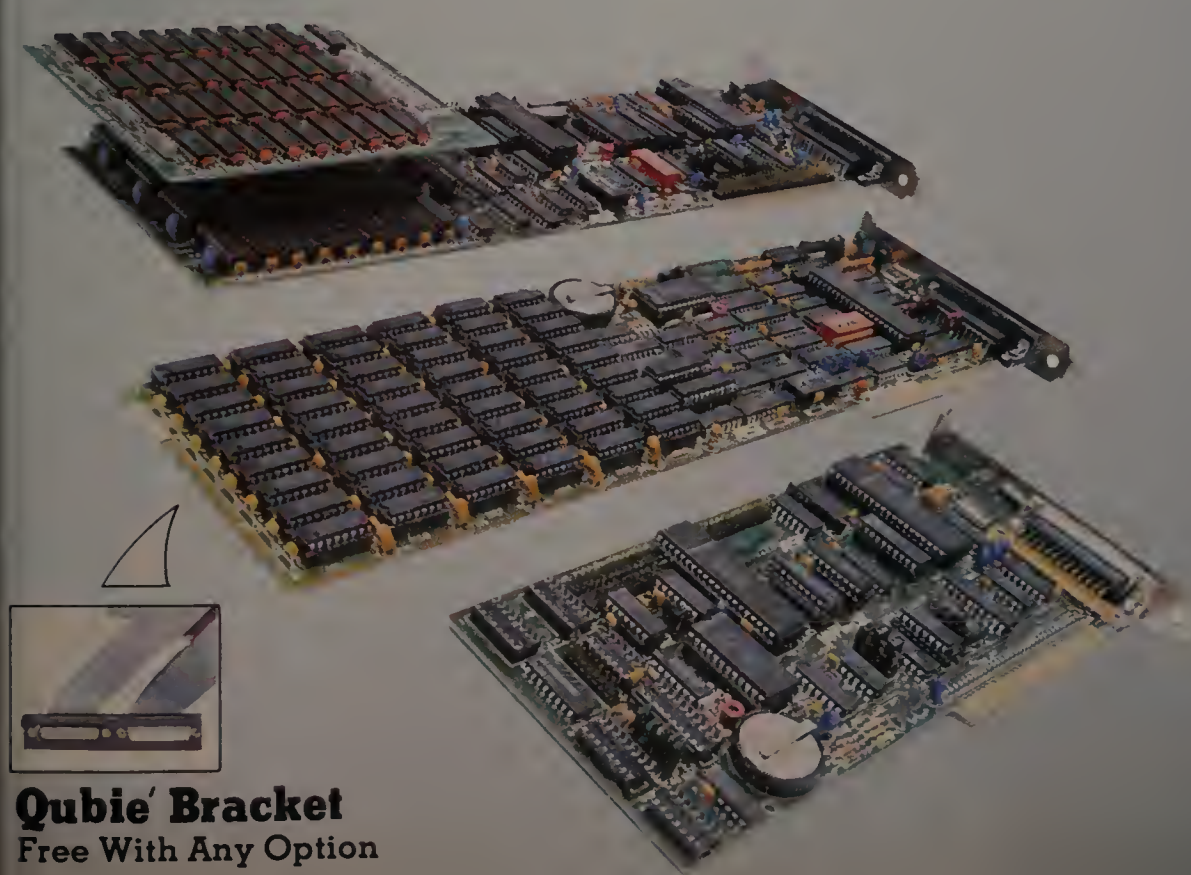

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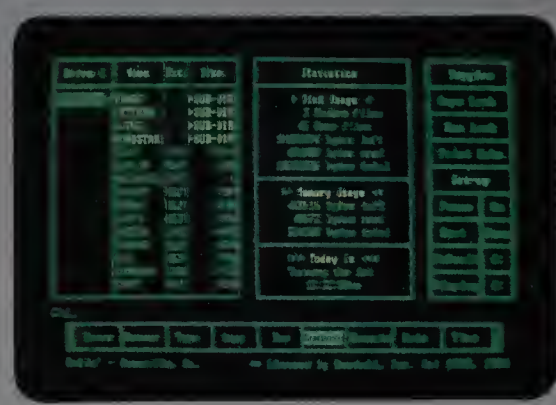

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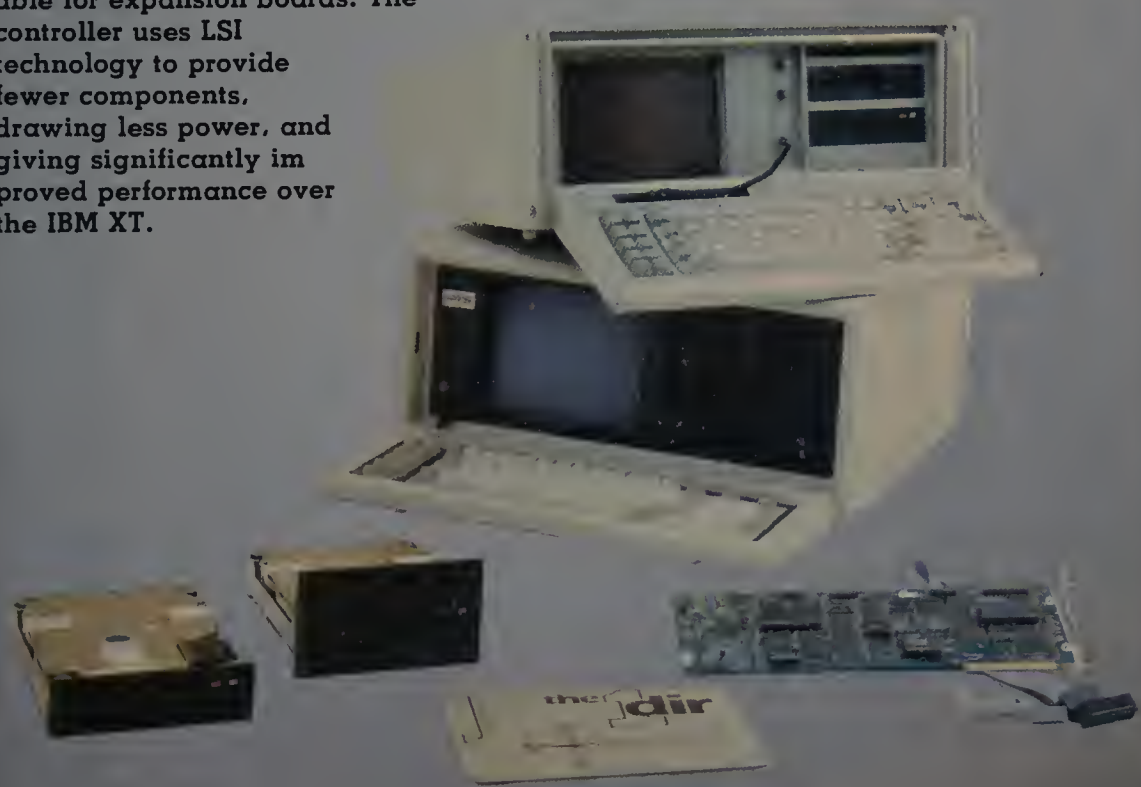

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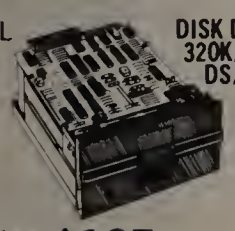

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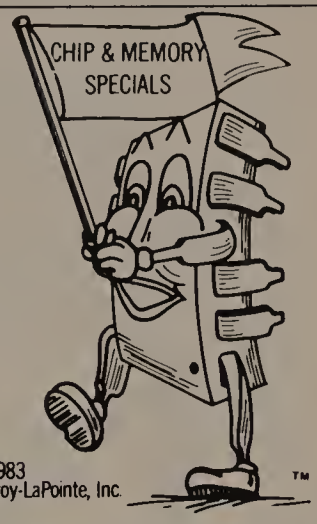

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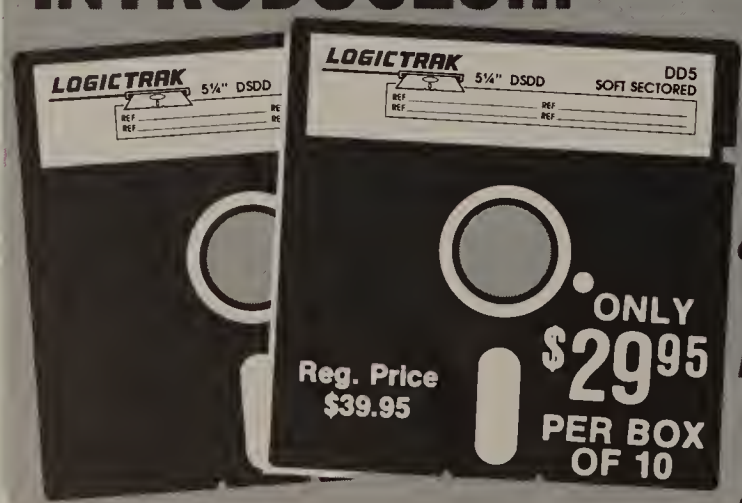

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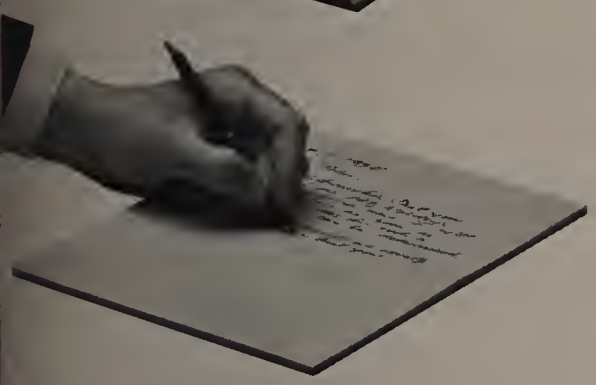

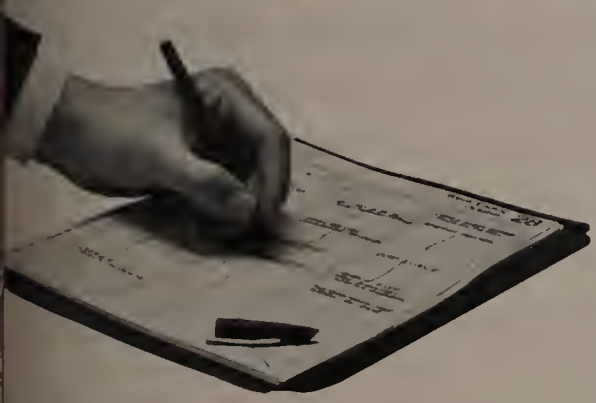

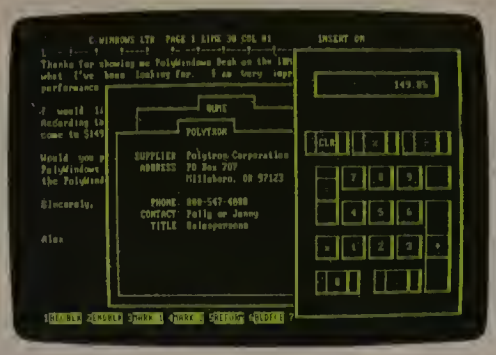

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HP's Desktop in a Briefcase

What weighs 8½ pounds, fits inside a briefcase, but performs like a desktop? Hewlett-Packard's HP 110 Portable runs on batteries while you're on the road and exchanges data with your IBM PC when you get home.

Danny Goodman

Ever since Osborne-size portable computers became available, people have dreamed of owning a powerful computer that was small enough to fit in a briefcase. That dream has gone largely unfulfilled. The Radio Shack Model 100 sparked the imaginations of many mobile computer users, but with only 32K of memory, it can't perform like a desktop computer. A few high-performance briefcase portables have been introduced, but they either lack practical displays (Teleram), are too expensive (GRiD), or were too long chained to the drawing board (Gavilan).

The good news is that a major manufacturer has taken the bold step of producing a briefcase computer that packs a wallop: it replicates the functions of an MS-DOS desktop computer; with the help of a cable and a PC interface board, it can read disks from an IBM PC; and it comes loaded with just about everyone's favorite software. The company is Hewlett-Packard, and the computer is the HP 110, which the manufacturer is calling, simply enough, The Portable. If consumers can swallow the $2995 price tag, it may rank as THE Portable.

The HP 110 fits into the briefcase class of portable computers by virtue of its compact size, 13 by 10 by 2⅞ inches, which is only slightly larger than a three-ring notebook. However, at 8½ pounds the HP 110 seems a bit heavy for extended periods of kneetop computing. I'd rather work with it on a desk. The Portable's neutral, putty-colored plastic case is unblemished by garish logos or other markings, and the computer comes with a black carrying case equipped with a handle and a shoulder strap.

Two spring-lock latches release the HP 110's "lid," which opens to reveal a full keyboard and an 80-column by 16-line liquid crystal display (LCD). (Hewlett-Packard plans to come out with a model that will offer a 24-line display.) The keyboard is typewriter style, with limited, yet adequate, vertical play. Across the top are eight programmable function keys, three dedicated function keys, and four cursor keys, the latter in an inconvenient horizontal row.

The Portable has no power-on switch; you turn it on by pressing any key on the keyboard. A function key on the top row turns off the computer, or you can let the self-timer, which is adjustable from 0 to 30 minutes, turn it off. When you turn it on again, you are returned to wherever you left off.

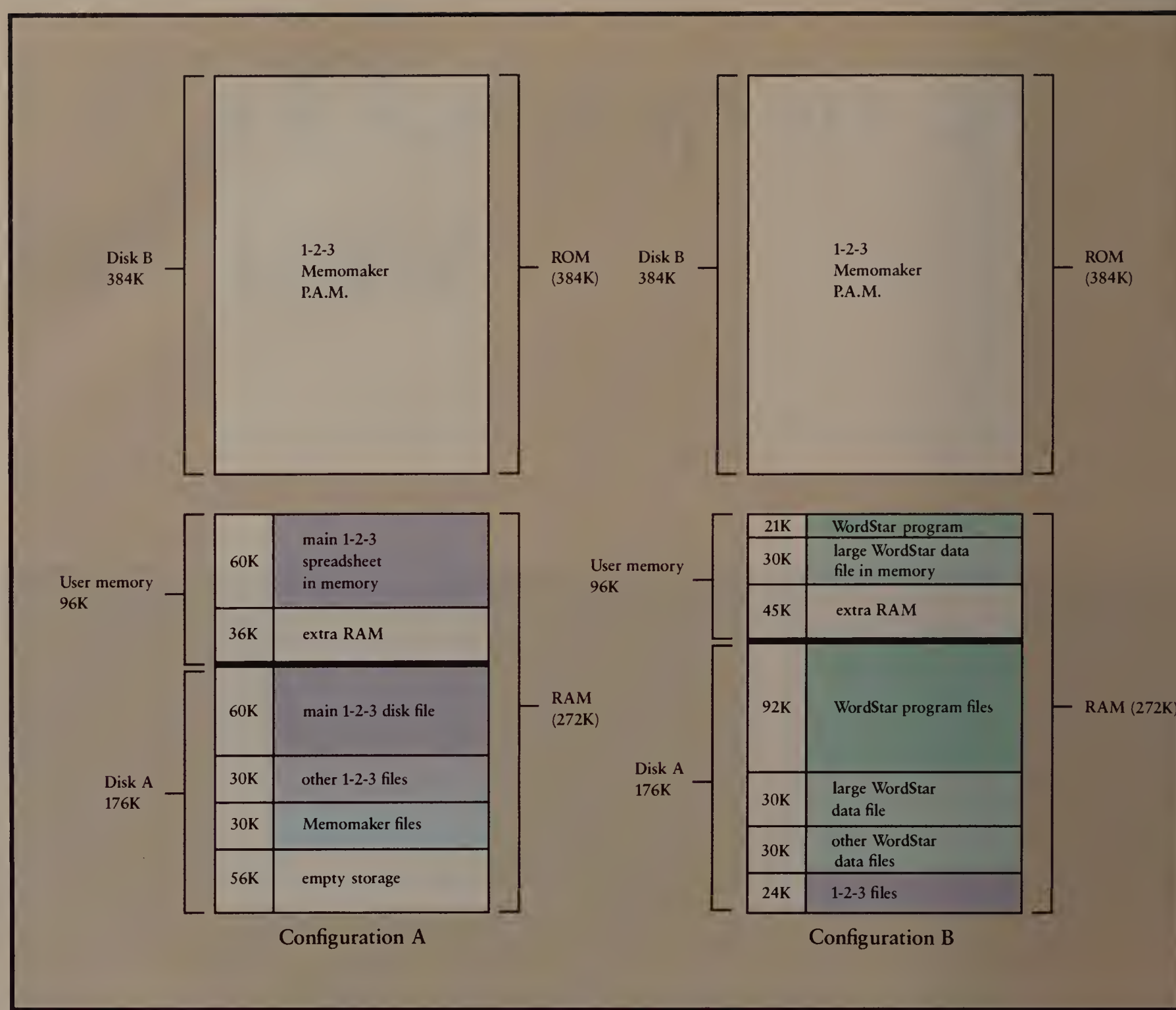
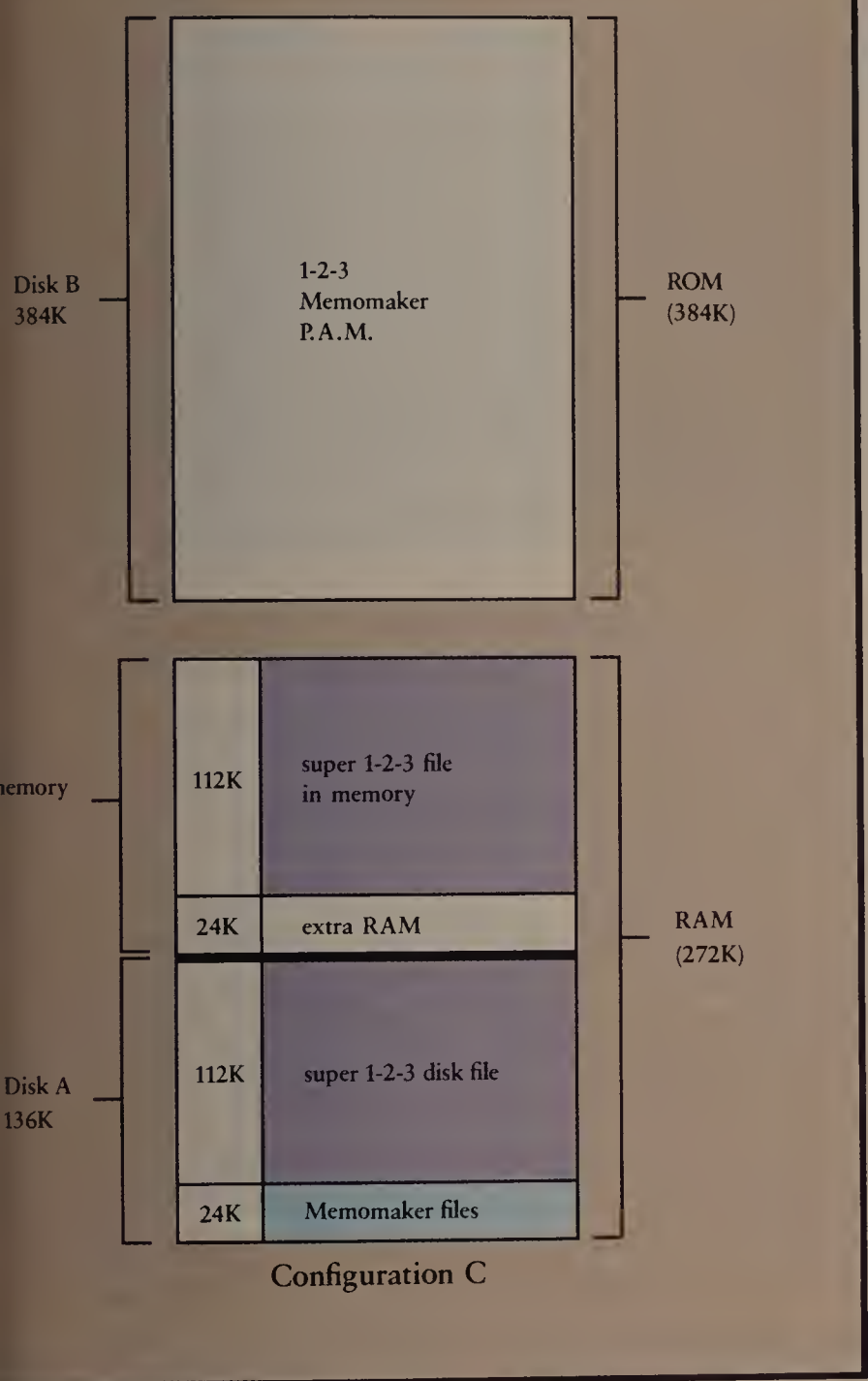


Figure 1: On the System Configuration menu you can divide the HP 110's 272K of RAM into work space memory and disk storage. Although 176K is the most you can devote to disk storage, you can shift more memory to the work space if you need it. Configuration A shows the maximum disk allocation. Configuration B shows what happens when you import WordStar from an external mi-

In graphics mode the 16-line display is capable of 128- by 480-pixel resolution. The contrast of LCD displays in general, however, is poor under typical lighting conditions. The murky display is the HP 110's most serious drawback. The HP 110 has an excellent character-font design, which makes the screen a little more readable, but unless you have arranged your lighting perfectly, you will find yourself squinting. At this time Hewlett-Packard offers no option to connect the computer to a video display.

Sixteen Hours of Computing

Powering The Portable is an intelligent rechargeable battery system. A full charge of its three internal batteries powers 16 continuous hours of computing. According to Hewlett-Packard you can leave the computer off for a full year, and all data stored in its low-power CMOS (complementary metal-oxide semiconductor) memory will be retained.



crofloppy disk drive—the disk can quickly fill up. Configuration C assigns more memory to the work space for working with large 1-2-3 spreadsheets.

If the batteries reach too low a level before you can recharge them, the computer automatically shuts down, preventing them from being completely drained and thus guarding against data loss. A 12-hour charge brings the batteries up to at least 95 percent of their full charge.

The rear panel of the HP 110 contains five small connectors: a telephone jack for the 300-bps internal modem, a 9-pin serial port, the battery charger outlet, and two connectors for the thin cables that link The Portable to its peripherals and to an IBM PC or a Hewlett-Packard HP 150 desktop computer. These last connectors are part of HP's proprietary method of linking peripherals, called the HP Interface Loop, or HP-IL for short. The ability to connect external disk drives, a printer, and a second computer through these wires (they're too thin to be called cables) is amazing to anyone who has wrestled with 25- and 36-pin connectors at the ends of fat, belligerent, snakelike interface cables.

Inside the Portable

Running the show inside the HP 110 is a low-power CMOS version of the Intel 8086 microprocessor. Because it communicates with peripherals in 16-bit chunks, this chip is considered more powerful than the PC's 8088, which processes data in 16-bit chunks within the chip but communicates in 8-bit chunks.

The MS-DOS 2.11 operating system and four major application programs are stored permanently in 384K of CMOS ROM. That section of memory is regarded by the operating system as the equivalent of a disk drive (drive B:). A total of 272K of CMOS memory is assigned to RAM, where you store your data and other programs not contained in ROM. This 272K is divided into two distinct parts: actual working memory and an electronic equivalent of a disk drive (drive A:). The RAM memory-to-disk ratio can be altered on the System Configuration menu.

The computer's active memory is used for holding current documents while the built-in application programs are running. Each time you finish working with a document, it must be stored as a disk file on the electronic disk. Your needs for memory or disk space will change according to the size of the programs you're using and whether those programs are imported from outside or resident in ROM. If you use only the programs in ROM, you can devote the lion's share of RAM to disk space. If you load an external program, you will have to devote more RAM to active memory (see Figure 1).

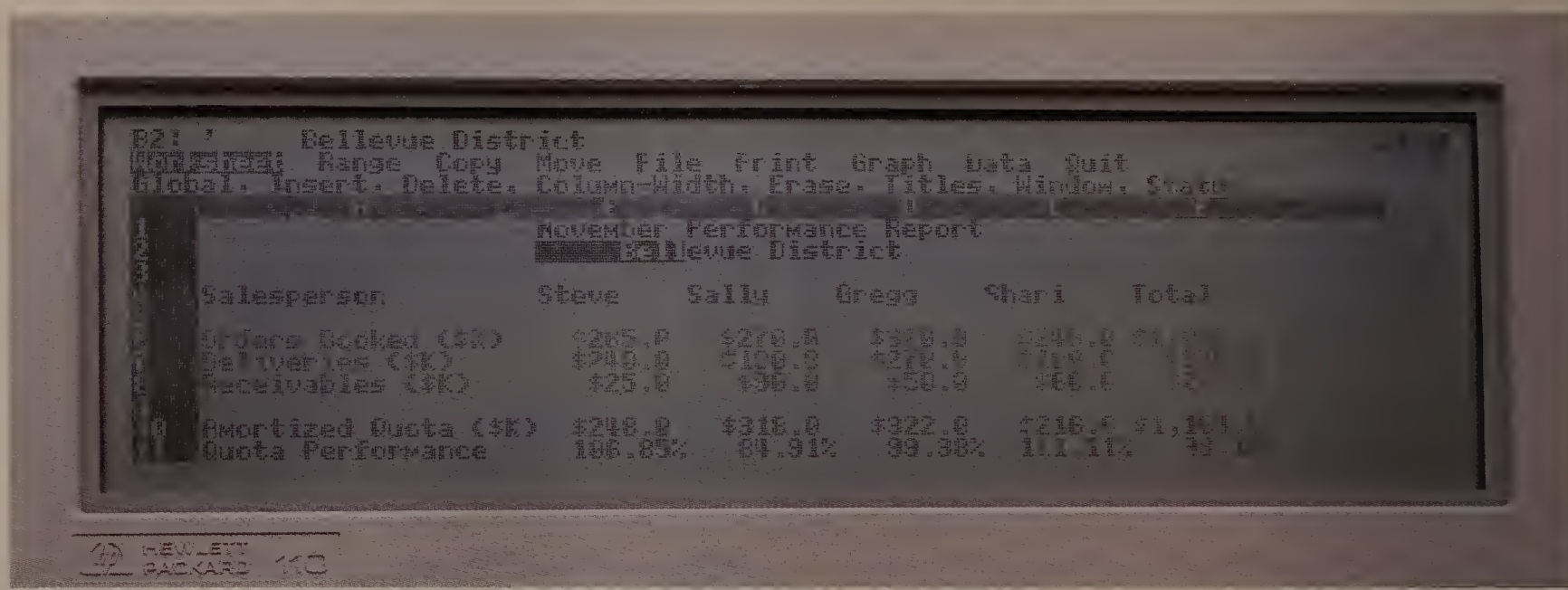


Figure 2: The HP 110 has Lotus Development Corporation's 1-2-3 built into ROM, along with a proprietary word processor and a communications program.

Built-In Software

The main attraction in the HP 110's circus of built-in software is Lotus Development Corporation's popular spreadsheet program *1-2-3*, which is identical to the PC version. The smaller display allows you to see only 8 columns by 11 rows at a time, but unlike the standard PC system, the HP 110 provides instant access to graphic representations of data (see Figure 2).

Depending on the size of a worksheet, *1-2-3* sometimes requires an upward adjustment in the amount of total memory partitioned for RAM. By housing the program in ROM and keeping worksheets stored on an electronic disk, the HP 110 version of *1-2-3* loads those elements much faster than the disk-based PC version.

Two cautions are worth noting. Because the Print Graph portion of *1-2-3* is available only on a 3½-inch disk, you need the companion disk drive to print graphs. Also, the HP 110 has no numeric keypad, making numeric entry more tedious.

The second major program contained in ROM is a simple text editor called Memomaker. Hewlett-Packard apparently believes that executives who use *1-2-3* don't write long, heavily formatted documents. Memomaker lacks basic word processing features like automatic text reformatting, paragraph indentation, on-screen pagination, and search and replace. The awkward straight-line cursor-key layout and the scarcity of cursor-motion controls make maneuvering the cursor a bit difficult. However, the program is adequate for writing simple memos or typing long rough drafts that you can send to a PC for editing and format refinements.

The third built-in program is the Terminal program, which turns the HP 110 into an intelligent telecommunications terminal. You can use it with either the 300-bps internal modem that comes with the HP 110 or with an external modem connected to the serial port. The software supports Ward Christensen's Xmodem error-checking file transfer protocol (called Modem7 in this program). Even when the HP 110 is turned off, Terminal can automatically answer a call and download a file. You can also program Terminal to send a file to a remote computer when you are not present.

Transferring files through the Terminal program takes a little getting used to. You have to fill out an on-screen configuration menu for each file you download or upload. When you go to this menu, you lose any prompts from a host computer that were on the screen. Furthermore, the HP 110 offers no audible verification of dialing, ringing, and connecting. You have to rely on messages displayed on the screen. Unfortunately, the otherwise excellent HP 110 user manual leaves many questions about the Terminal program unanswered and glosses over many of its important aspects.

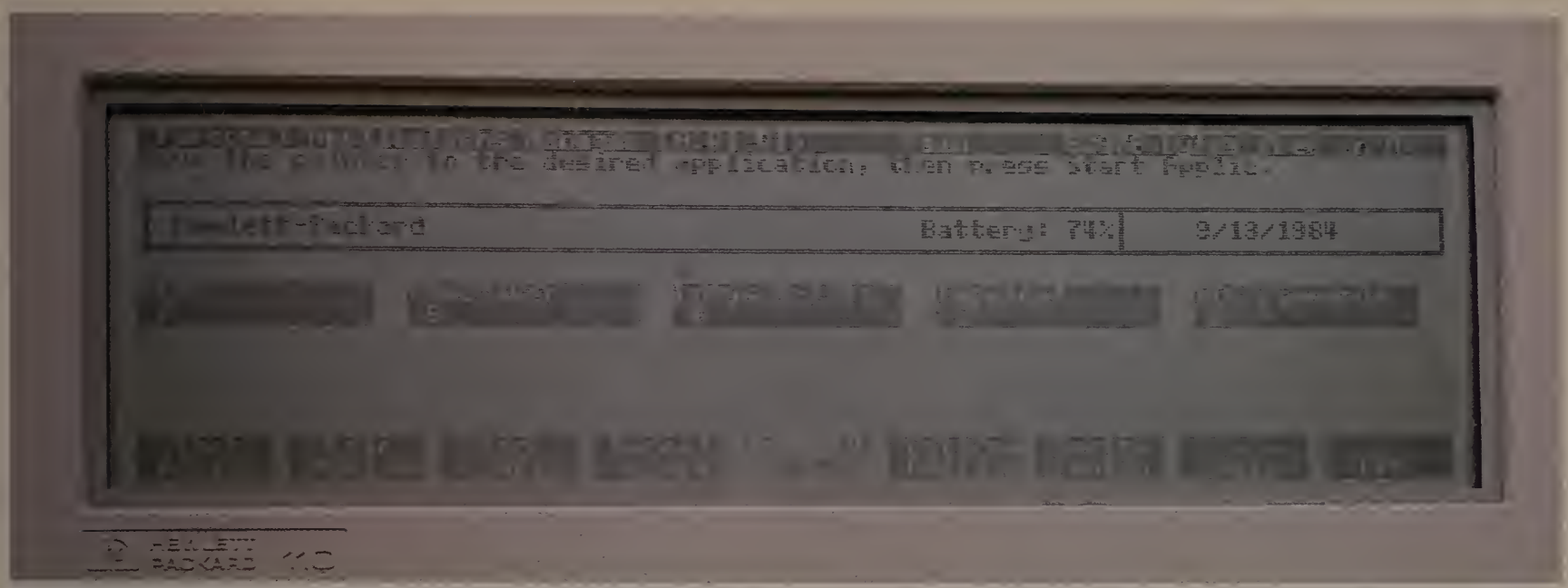


Figure 3: The HP 110's P.A.M. is the main menu and a link to DOS. P.A.M. also displays the time, date, and current battery level.

The last built-in program is called the Personal Applications Manager, or P.A.M. It acts as a user-friendly link between the user and the HP's built-in disk operating system (MS-DOS, version 2.11). P.A.M. appears whenever you turn on the HP 110, providing you with the current date and time, the battery power remaining, and a menu of applications available on all internal or external disks (see Figure 3).

While the P.A.M. menu is displayed, you can type a DOS command directly or use P.A.M.'s File Manager. The File Manager leads you through DOS commands for operations such as copying, renaming, making subdirectories, formatting external disks, changing the default disk drive, and erasing files. You can also write batch files in P.A.M. and change the P.A.M. menu to reflect other programs you have imported from outside.

If you add the optional external disk drive peripheral, you will be able to use other popular software with The Portable. Hewlett-Packard has released a *Who's Who* of software titles, including *Multiplan, WordStar, Microsoft Word, dBASE II*, and several Microsoft programming languages.

The problem with external software is that unless you stay at home, safely tied to your disk drive, the software takes up too much RAM. If you load *WordStar* into The Portable to take along on a trip, the program occupies about 92K of the maximum 176K of disk space, leaving only about 84K for all your word processing documents, *1-2-3* worksheets, and downloaded communications files. Suddenly The Portable's 272K of RAM is bursting at the seams.

HP Peripherals and the HP-IL

Hewlett-Packard's double-sided 3½-inch disk drive is battery operated and rechargeable. It uses the same Sony microfloppy system as the Apple Macintosh uses, except that it stores data on both sides of the disk. Formatted storage on a single microdisk is a hefty 710K (compared to the PC's 360K double-sided 5¼-inch drives).

Hewlett-Packard's ink jet printer, called the ThinkJet, is also battery powered. It produces fairly clear images with a minimum of noise at a fast 150 characters per second. The best printing results are obtained with HP's continuous-form paper for ink jet printers. When printed on standard computer paper, the images are light and the letters ill formed. The ThinkJet is capable of four print pitches, boldface, underlining, and dot-addressable graphics. None of the fonts could be considered letter quality, but many of them, including the standard pitch used with Memomaker, are more readable than those available with similarly priced dot matrix printers.

Both peripherals connect to the HP 110 through HP-IL, a unique method of daisy chaining peripherals so they make a complete loop. To link all three units, for example, you run one lightweight wire from the

Figure 4: The HP-110's peripherals include the ThinkJet ink jet printer, the 9114A DiskDrive, which can store up to 710K on 3½-inch disks, and cables and interface boards for exchanging data with a PC or an HP 150.

HP 110 to the disk drive, one from the disk drive to the printer, and one from the printer back to the HP 110. To retrieve information from a disk, the computer sends the appropriate signals through the loop. When the signal encounters the disk drive, it starts to read the data from the disk. The data then continues on its way through the loop back to the computer. The pieces of an HP-IL system (including the PC or the HP 150) can be placed in the loop in any order (see Figure 4).

Linking With a PC

A special interface board (different models exist for the PC and the HP 150) provides the proper connectors for the HP-IL cables (the Portable-Desktop Link). I tested the PC version, which comes with a disk that configures the PC to acknowledge the HP-IL signals. Instructions for installing the board are included on the disk.

With the interface board plugged into the PC and the HP-IL loop, the HP 110 accessed each of the disk drives in the PC as if it were its own. With electronic drives A: and B: already inside The Portable, I set up the external HP 3½-inch disk drive as drive C: and the two drives on the PC as D: and E:. I could read a *1-2-3* worksheet from a disk in drive E:, work on it, and save it on the HP's electronic disk. The IBM software for the board also lets the HP 110 use whatever printer is connected to the PC, enabling you to produce letter quality output with Memomaker.

Putting the PC in the controller seat, you can store and retrieve data on HP disks—including the built-in electronic disk. The only difference is that with that arrangement, the order of the disk drive designations shifts down the loop: the PC's internal drives become A: and B:, the HP's internal drives become C: and D:, and the external disk drive becomes drive E:. You can also direct output from the PC to the ThinkJet printer.

PC Compatibility

The HP 110, largely due to its unique display format, is really not a PC-compatible computer. You cannot use the HP-IL linkup to import programs from a PC to the HP 110, for example. But the HP 110 is definitely data compatible with the IBM PC

family. The ability not only to exchange data but to read data disks should be welcomed by executives who use a desktop computer at the office and want to take full computing power home or on the road without carrying a 40-pound computer.

The HP 110 is the ideal portable for those whose work revolves around *1-2-3;* there is ample memory and electronic disk space to hold a reasonable amount of work when on the go. Having a modem built into the portable is a plus. Of course everyone would like to see a disk drive built in and perhaps 512K available RAM, allowing for a 360K electronic disk, but the HP 110 as it currently stands is a powerful, sensible entry into the high-performance briefcase computer category—perhaps the one that will finally send this category on a skyrocket.

Danny Goodman, Contributing Editor to PC World *and* MacWorld, *is the author of* How To Buy an IBM PC *(PC World Books/Simon & Schuster Electronic Publishing),* The Simon & Schuster Guide to the TRS-80 Model 100, *and several other microcomputer books.*

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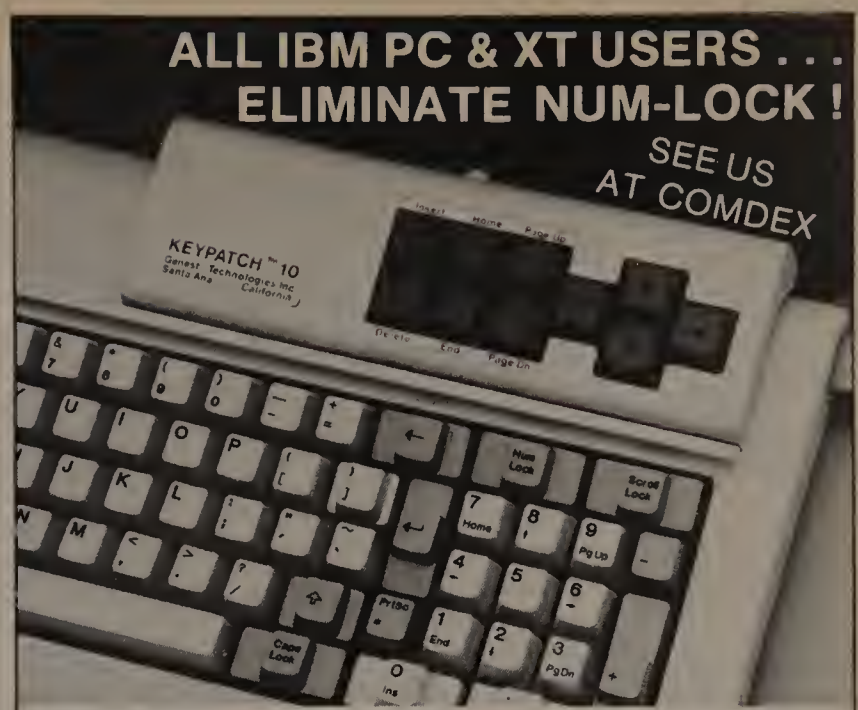

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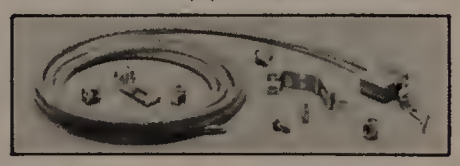

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dBASE III

dBASE III is more than just an update to dBASE II. Ashton-Tate has rewritten and refined this data management best-seller to make it easier for the novice and more powerful for the serious programmer.

David Jenkins

One of the greatest enigmas in the history of software was the enormous success of Ashton-Tate's data base management system (DBMS) *dBASE II*. The program was difficult to learn and plagued with bugs, and it often required the services of a *dBASE II* programmer to set up tailored applications. Yet for years *dBASE II* far outclassed the competition in power and flexibility, and when other data management programs finally appeared that combined power with user-friendliness, many users stayed with the old reliable.

Now, with the introduction of *dBASE III*, you can enjoy all the depth and programmability of *dBASE II* along with the ease of use of the new breed of data management software. The program structure is similar to that of its predecessor, but inconsistencies and bugs have been removed, and the Sort algorithms have been improved so the program performs faster.

For people who already own *dBASE II*, the best part of the new product is the price. Although the program costs $695 off the shelf, for $200 *dBASE II* owners can purchase a dBASE Upgrade Kit—a fancy name for a box in which you return your old *dBASE II* documentation and master disk to Ashton-Tate. The company will send you a complete *dBASE III* package in exchange. Ashton-Tate is not sure whether it will extend the upgrade offer into 1985.

The most significant enhancement of *dBASE III* is the Assistant, a user interface for novices. This extra level of help explains commands and asks questions in plain English. Since the actions required are mainly pointing and selecting, the user needs little knowledge of *dBASE*. Two other important features for the novice are the easily separated mailing labels and considerable on-line assistance in report writing. Retrieving information from a data base has also been simplified.

For the experienced *dBASE* user, many of the constraints of *dBASE II* have been removed. Ten data files can now be open simultaneously, in place of *dBASE II*'s infamous two files. Each data base can have 128 fields, and the Pascal-like capabilities of the memory variables give the user greater control over program structure.

Ashton-Tate has added a host of other major and minor refinements to the operations of *dBASE II*. For example, Find and Locate now operate in the same logical

way. Two new variable types, date and memo, are available, and many new functions have been added, such as average, square root, and logarithm.

dBASE III's text editor is considerably more powerful than that of *dBASE II,* and information retrieval is better. Create Report displays the column headings as they will appear on the report. The List and Display commands use field names as headings on the output. As an example of *dBASE III*'s improved details, the record number now prints out without leading zeros (123 instead of 000123). (See Table 1 for a comparison of *dBASE III* and *dBASE II* features.)

Finally—A Readable Manual

dBASE III comes with three copy-protected disks, a manual, a quick-reference manual, and a short booklet, *dBASE BRIDGE,* written by Adam Green that explains how to convert data and program files from *dBASE II* to *dBASE III.* The first disk is a system disk; the second is a backup of the first; and the third contains two utilities: dconvert.com, which helps convert *dBASE II* files to *dBASE III* files, and dformat.com, the text editor and screen generator. The third disk also contains programs and data for a sample *dBASE III* application.

Unlike the notoriously bad *dBASE II* documentation, the *dBASE III* manual is typeset and readable. The first section is a tutorial that introduces a user to the basic applications of *dBASE III.* It is followed by two reference sections, one on commands and one on functions. The rest of the manual is devoted to appendices, a glossary of terms, and an extensive index. Numerous examples of *dBASE III* instructions appear throughout the manual.

The dBASE Assistant

The user operates most DBMS and file management programs by choosing commands from simple menus. Each step of the task is presented in order, along with simple English prompts. In contrast, *dBASE II* operates much like a computer language. In order to use the program effectively you must first learn the dBASE syntax. For example, to generate a list of the names, addresses, and ages of the people on file who live in California and are over age 20 you must type:

```
Display name,address,age for
state="ca" .and. age>20
```

dBASE III's Assistant is designed for the user who is not yet familiar with *dBASE* or who does not wish to spend the time needed to learn the commands. The Assistant is an interactive, "hand-holding" device that asks simple questions and displays the available choices to help novices use *dBASE. dBASE* commands are created one step at a time as the Assistant translates each intended action into the proper syntax. The actual completed command is shown on the lower part of the screen. The Assistant can be easily turned off and on.

To activate the Assistant, type **assist** at the prompt. After an initial screen appears explaining the cursor controls, you arrive at the main menu, which displays a list of six selections on the top line: Set Up, Modify, Position, Retrieve, Organize, and Utilities (see Figure 1). Press <Enter> to move to the next selection and <Esc> to make a choice. If you hesitate before making a choice, the Assistant assumes you need more help and displays descriptions of the possible choices.

The Set Up option covers such tasks as creating data bases and defining reports and labels. Modify comprises the data entry sections of *dBASE III,* such as Append, Browse, and Edit. Position lets you move around the data base by using the Go To, Find, and Locate commands. Retrieve calls up information.

If you choose Retrieve and then Display, you are in effect issuing a *dBASE* Display command. For instance, on one screen you decide whether to Display only the current record, the NEXT *n* records, all records from the data base, or one specified record. Another

The Assistant is an interactive, "hand-holding" device that asks simple questions and displays the available choices to help novices use dBASE.

Table 1: Comparison of dBASE III and dBASE II

	dBASE III	dBASE II
Type of computer processor	16 bit (8086)	8 bit (8080, Z80) and 16 bit (8086)
Maximum number of records	1 billion	64K
Fields per record	128	32
Maximum data files open	10	2
Maximum index files open (per data file)	7	7
Maximum record size	4000 bytes	1000 bytes
Numeric accuracy	15-16 digits	10 significant figures
Memory variables	256	64
Maximum memory for all memory variables	6000	1000
Data entry verification	Yes	No
Data types	Numeric	Numeric
	Character	Character
	Logical	Logical
	Date	
	Memo	
Ability to correct a command	No	Yes
Copy protection	Yes	No
Minimum disk space required for dBASE programs	261K	70K
RAM required	256K	128K
Language written in	C	Assembler
Help facilities	Ashton-Tate Hotline	Ashton-Tate Hotline
	Improved on-line help	On-line help
	Excellent manual with tutorial	Much criticized manual
	On-line Assistant provides "hand-holding" for novices	Disk tutorial

screen shows all fields from the data base in use, and you select the fields to display by moving the cursor and pressing <Enter> at the appropriate places. In place of the FOR clause, you select a field from the data base, then choose from the logical operators and enter their condition. You might choose the state field, then the = operator, and then type **CA** to produce FOR state = "CA" in the Display command.

The Assistant suffers from some limitations. Certain error messages are not as clear as one would like. For instance, I tried to create a report in the Retrieve section, even though I knew the report had to be created in the Set Up section. The error message I received was, 'There are no files of the type you requested on this drive'. It would be difficult for a novice to know that this meant, 'You can't run your report because you haven't been to Set Up and created it yet'.

Nonetheless, the idea and the implementation of the Assistant are great assets. Novices undoubtedly will be more quickly productive than with *dBASE II*. The Assistant will also enable professional programmers to leave some complex tasks to be programmed by novice users. In *dBASE II* users were simply left to their own resources, with a manual of dubious value. Indeed, it is remarkable that so many people survived to become *dBASE* aficionados.

Converting From dBASE II

To use *dBASE II* programs and data, you must convert them into *dBASE III* formats, even though *dBASE III* uses the same file types. The dconvert.com utility handles most conversions simply and easily.

Data files (.DBF) convert in one step. The user need only know the name of the file. Index files (.NDX) require an extra step: dconvert.com examines the *dBASE II* index file, finds the key expression, and generates a command file that produces the same index in *dBASE III*.

Converting program files can be more complicated. For example, End of File is written EOF() instead of EOF, and Erase is translated into Clear. The record num-

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ber is no longer written as # but Recno(). Many other minor discrepancies between *dBASE II* and *dBASE III* appear only when the program is run.

One conversion problem stems from the difference in the way *dBASE III* handles memory variables. Only variables created at the dot-prompt level behave like *dBASE II* variables. Therefore, unlike working with *dBASE II*, it is important to keep track of where the variable was created and to know whether it was created at a higher level (by a program that called the current program) or at a lower level (by a program that is called by the current program).

Variables can now be hidden in three ways. As the default, low-level command files release their variables when control passes back to the high-level command file. Variables that were first created at the low level disappear on their return to the high level, and an error message results. (Incidentally, error messages are greatly improved in *dBASE III*. The vague 'syntax error' has given way to messages like 'variable not found' and 'data type mismatch'.) Variables have two other settings. Public means the variable is available to all parts of the program and must be released by the user. Private means that the variable cannot be accessed by low-level routines.

In the short run, the new memory variables are likely to cause a great deal of confusion. In the long run, however, they greatly enhance *dBASE* as a programming language. Parts of programs can now be written to make variables completely independent of other parts of any other program. Portability and reusability will produce outstanding benefits.

dBASE and DOS

dBASE III's interface with DOS has been refined so that *dBASE III*'s terminology is more like DOS's. Dir replaces List Files Like, and Erase replaces Delete File. Type has been added, and Copy now copies all files, not just data base files. A Set Path command lets the user specify a series of DOS subdirectories to be searched. Run now executes any .COM or .EXE program as long as sufficient RAM is available.

New Variable Types

dBASE III provides two new types of variables: dates and memos. The beauty of the date type is its ability to perform date arithmetic. Adding a date and a number produces a new date. For example, to calculate the date one week from the system date, type:

```
? date()
07/25/84
store date()+7 to nextweek
```

The program will respond '08/01/84'.

To find out how many days there are between two dates, you perform a subtraction:

```
? nextweek-date()
7
```

A variable designated as a date occupies 8 bytes. Accompanying the date type are new date functions: DOW() returns the day of

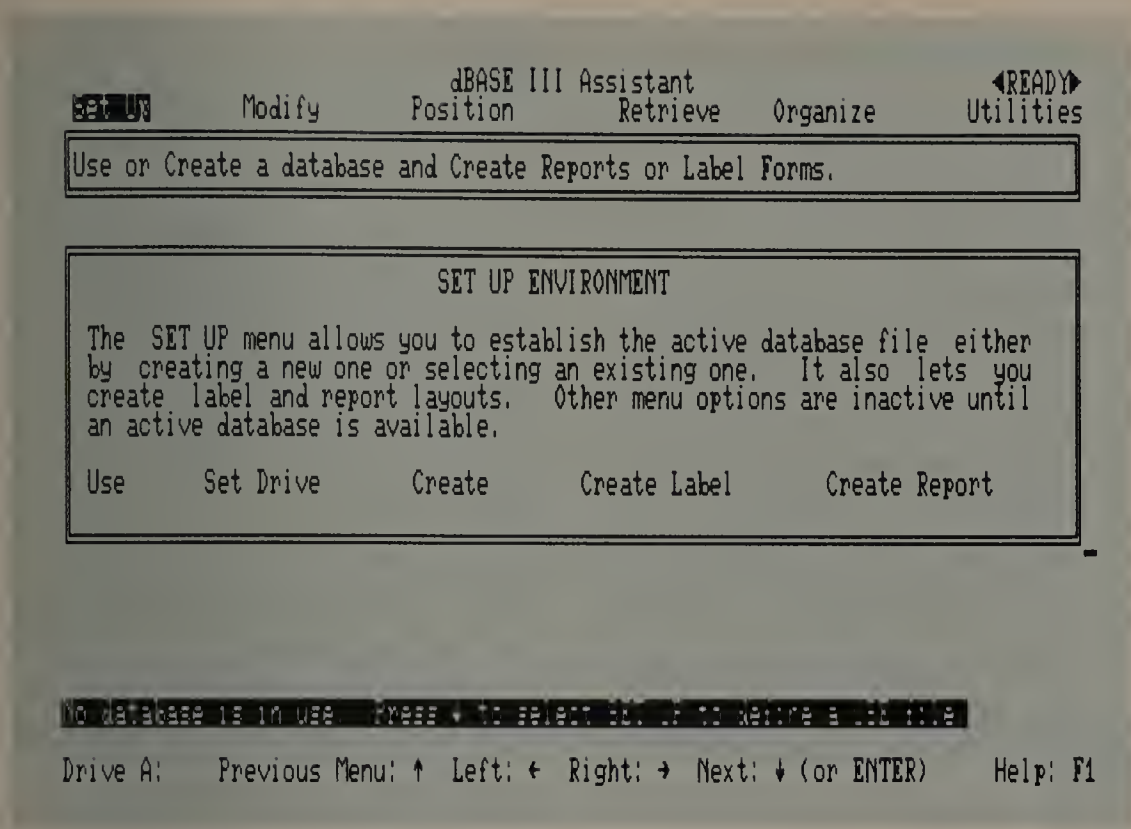

Figure 1: The main menu of dBASE III's Assistant, a user interface for novices. Rather than requiring a knowledge of dBASE commands, the Assistant allows you to program by responding to English prompts.

the week as a number from 1 to 7; CDOW() returns the name of the day of the week; Day(), Month(), and Year() return the day of the month, the month, and the year as numbers.

The memo fields in *dBASE III* differ vastly from those found in *dBASE II*. As the name suggests, a memo field allows the user to enter notes and comments that vary for different records. In contrast, the structure of all other *dBASE* variable types–string, number, logical, and date–requires that in every record in the file, you allocate the same amount of space for the field using that variable type.

dBASE III uses 10 bytes for each record of a memo file in the data base file but keeps the actual memos in a .DBT file.

Accessing a memo field is different from entering information into other types of fields. When the memo field is displayed in an Edit or Append screen, only the word 'memo' appears (as if this were a string that contained 'memo'). When the cursor is placed at this field, the user can see the contents of the memo by pressing <Ctrl>-<PgDn>. This clears the screen and brings up the text of the memo, which can be altered as if it were a document being edited with a word processor. <Ctrl>-<PgUp> moves the memo field and returns the previous screen. If you have more than 256K of RAM, you can enter data with an external word pro-

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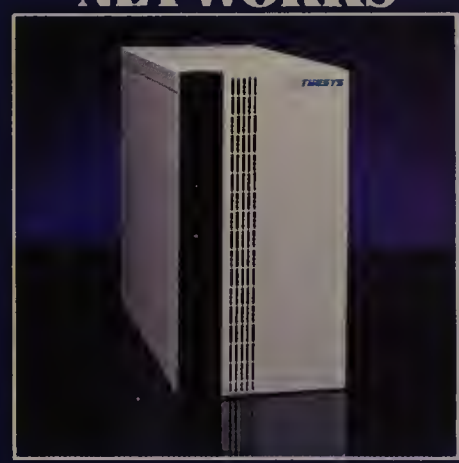

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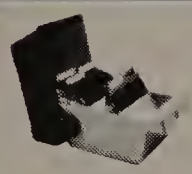

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cessor. However, you must set the name of the word processor in the CONFIG.DB configuration file and have the word processor on the same disk as *dBASE III*.

Memo fields can be transferred out of *dBASE III*, but not easily. The Copy command does not operate on memo fields, and the *dBASE III* text editor does not produce straight ASCII files that can be read directly. If you use a separate word processor, you may be able to read the .DBT file directly. You can also create a report and then direct the report to a file (another new feature), or you can use the Set Alternate commands to send the memos to a file.

Ashton-Tate has revised the Modify Command command and the text editing features of data entry, to provide *dBASE III* with a highly respectable text editor. The text editor operates at acceptable speeds, has no obvious bugs, and has numerous control functions. The cursor can move either a character or a word at a time, and it can jump to the beginning or end of a line. Once in Modify Command, the program can read in additional files with <Ctrl>-K R; <Ctrl>-K W writes the file into another file.

dBASE III follows the trend toward bigger programs. Because it uses so much more RAM and disk space than dBASE II, it is less easy to use on a floppy disk system.

New Program Controls

A Do command can now accept parameters. This brings *dBASE III* into line with other programming languages such as FORTRAN, COBOL, and Pascal. The calling program writes

Do *filename* **with a,b,c**

and the receiving program, *filename*, commences with

parameter x,y,z

Then whatever values are in *a*, *b*, and *c* at the beginning of *filename* are taken as the values of *x*, *y*, and *z*. At the end of *filename*, the values of *x*, *y*, and *z* are transferred to *a*, *b*, and *c*.

Unlike *dBASE II*'s DO WHILE loop, *dBASE III*'s doesn't allow macros. For example, you cannot write

store "y" to answer
do while continue = &answer

The reason, apparently, is that macros would slow down all DO WHILE loops, which are critical in the performance of command files.

dBASE III has one glaring omission. When an error occurs in a command file, there is no way to

pass control back temporarily to the user. There are only two choices: ignore the command or return to the dot prompt. If you return to the dot prompt, the values of any non-public variables are lost. The erring command line cannot be changed, and the user cannot inspect memory, find the current record number, or use the Display Stat command.

My solution to the problem is to produce a companion command file for each .PRG file that makes all variables public. In this way, when I return to the dot prompt, I can examine the variables. When the command file is debugged, I no longer set those variables as public.

Attention to Detail

dBASE III follows the trend toward bigger programs for the PC and the PC XT. Because it uses so much more RAM and disk space than *dBASE II*, it is less easy to use on a floppy disk system. Users whose projects fit tightly on two floppies might well be advised to simply keep using *dBASE II*.

dBASE III is unquestionably superior to *dBASE II*—many people who found *dBASE II* unacceptable will be pleased with the new product. *dBASE III* has moved from 8-bit into 16-bit territory, and by adding the Assistant it now straddles a much wider segment of the consumer market. The program's improvements make it more viable both for newer users who require assistance and for the more expert who were frustrated by the limitations of *dBASE II*.

In performance, certain areas are significantly improved, notably the Sort, Index, and Browse commands. The most remarkable aspect of the change from *dBASE II* to *dBASE III* is the extent to which Ashton-Tate has reexamined, rethought, and refined the details of the program. The company has paid attention to its competition without abandoning the structure and language that made *dBASE II* great.

David Jenkins is the president of Midway Software, a consulting and programming company based in Berkeley, California, that specializes in dBASE II *applications.*

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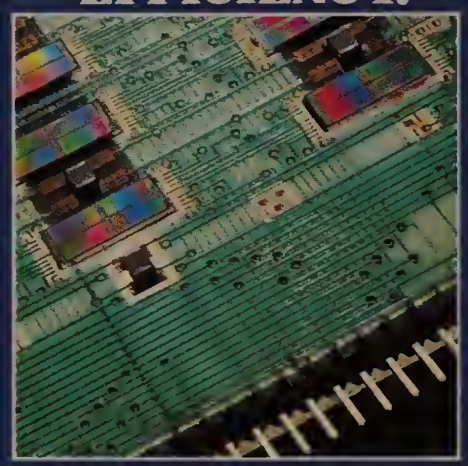

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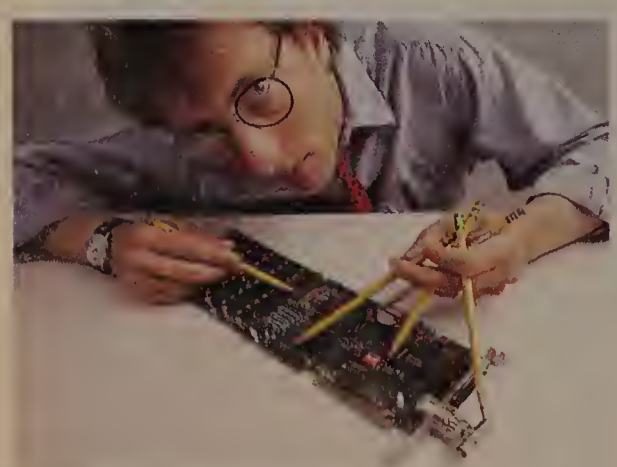
IBM, in its infinite wisdom, gave us *just five slots* to put additional circuit boards into the PC. But the PC can be enhanced in a lot more than five ways. So smart money buys a multifunction board and gets a whole lot of action out of only *one* of those five slots.

A single multifunction board can: 1. increase your computer's memory; 2. set you up to add a printer, mouse, modem, and/or other device; 3. tell your computer the date and the time; and now even, 4. prepare you for networking with other IBM-PC's.

Most multifunction boards come with their own software that puts it on the same wavelength as your motherboard. You'll be able to do things like: 1. input new data while the printer is outputting hard copy; 2. pretend you have additional disk drives; 3. have faster access to frequently used programs or files; and, 4. automatically back-up your data to a hard disk every few seconds.

Those are some of the reasons why multifunction boards are the hottest thing since the push-button phone. But if you want to be able to go to parties and talk about your new "multifunctionboardwith 384KofRAM,parallelport,serialport,clock-calendar,RAMdisk,diskcaching,printspooler, andnetworkinginterface" and actually understand what you're saying, you may have to refer to the very fine print in the glossary. So, whenever you see a term you don't understand, try the glossary.



Up close, multifunction boards look no more complicated than a map of San Francisco.

Glossary

A guide to multifunction board terminology for English-speaking people.

Please excuse the small type. But it was the only way we could squeeze all of these multifunction board basics on two pages. Besides, small type excites some people. So let's get down to business.

Multifunction board. A circuit board that fits into one I/O (input/output) slot and does more than one thing. This ad is about multifunction memory boards—extra RAM, some I/O ports, and other features. There are also multifunction graphics boards. We'll have to save them for another ad.

Memory. The new PC's and the XT have room on the motherboard for 256K. But they can address (a.k.a. find, locate, call up, cope with) 640K. The best multifunction boards have room for an additional 384K. 384K + 256K = 640K. You can add the memory in 64K blocks as needed

Serial port. a.k.a. "async" or "asynchronous communications port," or "asynchronous adapter." You can hook a mouse, a plotter, a serial printer or any other serial device to this port. A serial device is a gadget that communicates with the computer one bit at a time. Just follow the instructions and the electrons will take care of the rest

Parallel port. Most printers used with IBM personal computers connect via a parallel port. Parallel devices are gadgets that communicate with the computer eight bits at a time.

Clock calendar. Turn your computer on and it knows what day and time it is. Which is more than you can say for a lot of us when we wake up in the morning.

Game port. Where you plug in your joystick.

Local Area Network (LAN). All of the circuit boards, cables, connectors, and software you need to tie a few IBM's together in one office.

Networking interface. The Orchid BLOSSOM comes with a networking interface. That means that when you slap a PCnet daughterboard on top of it, it knows what hit it and what to do about it

User-transparent. PCnet is user-transparent. Each user treats the network as if it were his/her own huge computer with a whole lot of disk drives and memory. There are no complex formulas for going from using only your own computer to using the network.

File allocation table locking. Since DOS is single-user, networks need to protect against cross-locking files on public volumes. PCnet does this by insuring that each disk write request sees a fresh copy of the File Allocation Table. This enables two or more users to write at the same time, and eliminates the need to pre-allocate database files.

PCnet TALK. Communicate easily with your fellow networkers. Your message on one half the screen. Their message on the other half.

Disk partitioning. On both BLOSSOM and PCnet software. This program allows you to partition any hard disk into multiple volumes, which you treat like extra disk drives (maximum 16 per PC). In addition you can designate any of these volumes as public or private. Keep your public files public and your private files private.

RAM disk. On BLOSSOM, Quadboard, SixPakPlus, and PCnet software RAM disk lets you designate part of the available memory as additional disk drives. But these "drives" are electronic. In other words, they're fast.

Disk cache. On BLOSSOM, Quadboard, and PCnet software. Disk caching stores frequently used data in RAM. It is an intelligent RAM disk. When your program looks for a data file it first looks at the cache. If the data isn't there it gets it from the drive, and pulls it through the cache, leaving a duplicate there for future quick access When you save data, a copy is automatically written to the cache at the server PC which flushes the changes back to the disk every 1 to 60 seconds (you choose). You don't have to wait while your data is being written to the disk. The server PC takes care of it.

Print spooler. On BLOSSOM, Quadboard, SixPakPlus, and PCnet software. A print spooler (a.k.a. printer buffer) lets you dump output to the printer as a background process First the PC dumps the output to the spooler's RAM buffer at high speed. Then the spooler delivers the output to the printer as fast as the printer can take it. You're already back to work at some new project while the printer's still chugging along.

Which ones work?

PC Connection has sold thousands of multifunction boards. Our two most popular ones have been AST's SixPakPlus™ and the expanded Quadboard™ from Quadram. They both offer a very attractive combination of ingredients: up to 384K of additional RAM, serial port, parallel port, clock calendar, RAM disk, and print spooler. The Quadboard also has a game port, disk caching software, and a "connectall" bracket for arranging your cables neatly. AST offers a game port as an option. We sell both boards for the same price. And our customers have been very pleased with their performance.

The multifunction board breakthrough of the year.

My real inspiration for writing an ad is the new board that just came out from Orchid Technology.

It's called the BLOSSOM,™ and it has all the standard features mentioned above, like up to 384K of RAM, serial port, parallel port, clock calendar, RAM disk, print spooler, and disk caching.

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me about multifunction
I'll write an ad."

—DAVID HALL, C.E.O.
PC CONNECTION

Networking lets your PC's share data, peripherals, and their deepest, darkest secrets.

But, unlike *any* other multifunction board, BLOSSOM is designed so that *you can piggy-back a networking board on top of it. Without using an additional expansion slot in the PC.* (In the picture, that's the BLOSSOM Board on the left and Orchid's PCnet™ piggy-back board on the right.)

At last we have one multifunction board that answers all the needs of your typical basic business PC *in just one expansion slot.* And it's actually less expensive than SixPakPlus or the Quadboard. To me that's very impressive.

Networking simplified.

If they gave awards for the computer word-of-the-year, "networking" would be a strong candidate in 1984. It seems that suddenly everyone who owns one PC wants to own two or three or more. And they want those PC's to cooperate—sharing data, printers, disk drives, and even in-house software. Networking saves time. And it saves money.

Orchid Technology has been one of the leaders in networking ever since they developed the very effective, low cost Local Area Network (LAN) called PCnet.

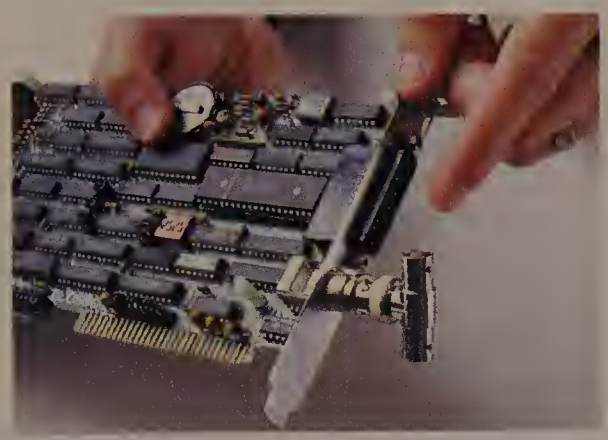
You see other manufacturers selling PCnet as their own product because Orchid licensed it to them. But now you can get Orchid's version along with their most up-to-date version of PCnet software, directly from us. Either alone or, better yet, sitting on top of the Orchid BLOSSOM multifunction board. The picture at the upper right shows how Orchid's new compact PCnet "daughterboard" slips right on top of a set of gold-plated pins on the BLOSSOM board. The coaxial connector for networking is there on the BLOSSOM board, at the right.

Networking complicated.

If you've done some research into networking you know that each system has its own complexities. Orchid's PCnet has a strong reputation for its simplicity and low-cost. PCnet 2.4, the new PCnet software *available only on the Orchid versions,* puts PCnet right up there as far as speed goes.

The key is intelligent use of PCnet 2.4 software—RAM disk, disk caching, partitioning, print spooling, and multi-sector I/O, all of which can work together to keep your data and programs where you want them, for faster access when you want them.

On closer analysis, PCnet turns out to be a very powerful LAN at a very low price. Other features include: PCnet TALK, and



There's your coaxial connector for networking, right on the BLOSSOM board.

true public file sharing via an automatic File Allocation Table (F.A.T.). Best of all, PCnet is so user transparent, and Orchid's new manual is so straightforward, that it can cure your most computer-timid employee of networkphobia. I promise!

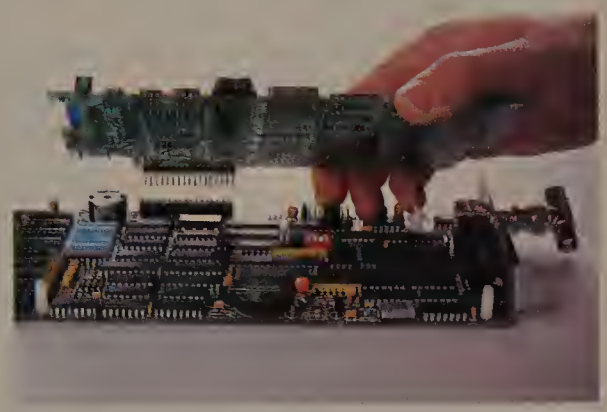
(Networkphobia is not in the glossary—but most of those other fancy words are.)

E Pluribus Unum.

Of the many multifunction boards on the market, I'd definitely choose the BLOSSOM. Because, as far as I'm concerned, if there's one thing in the future of most PC's, it's networking.

1-800/243-8088

For the IBM-PC exclusively. 292W



Orchid's PCnet "daughter board" slips right on top of BLOSSOM.

If networking doesn't interest you, the Orchid BLOSSOM is still a powerful multifunction board. And it looks like there are some other impressive "daughterboards" coming down the Orchid R&D pipeline that you could add on later.

And now that I've written this ad, I'm ready to answer some more questions. About the BLOSSOM, SixPakPlus, Quadboard, other multifunction boards, and/or the other hundreds of hardware and software products PC Connection has for your IBM-PC. Just call.

Products and Prices.

AST
AST SixPakPlus, 64K $269
Optional game port 39

Quadram
Quadram Quadboard, 64K 269

Orchid
BLOSSOM, 0K 199
BLOSSOM, 64K 239
PCnet daughterboard . . . . . call
PCnet BLOSSOM (64K BLOSSOM with daughterboard installed) . . . call
Cluster kit (25 ft. cable, manual, and PCnet software) 69
note: other cable lengths are available

Memory
Additional 64K upgrades for any board 49
We'll install your upgrade(s), put the board in one of our IBM-PC's and run diagnostics for only 10

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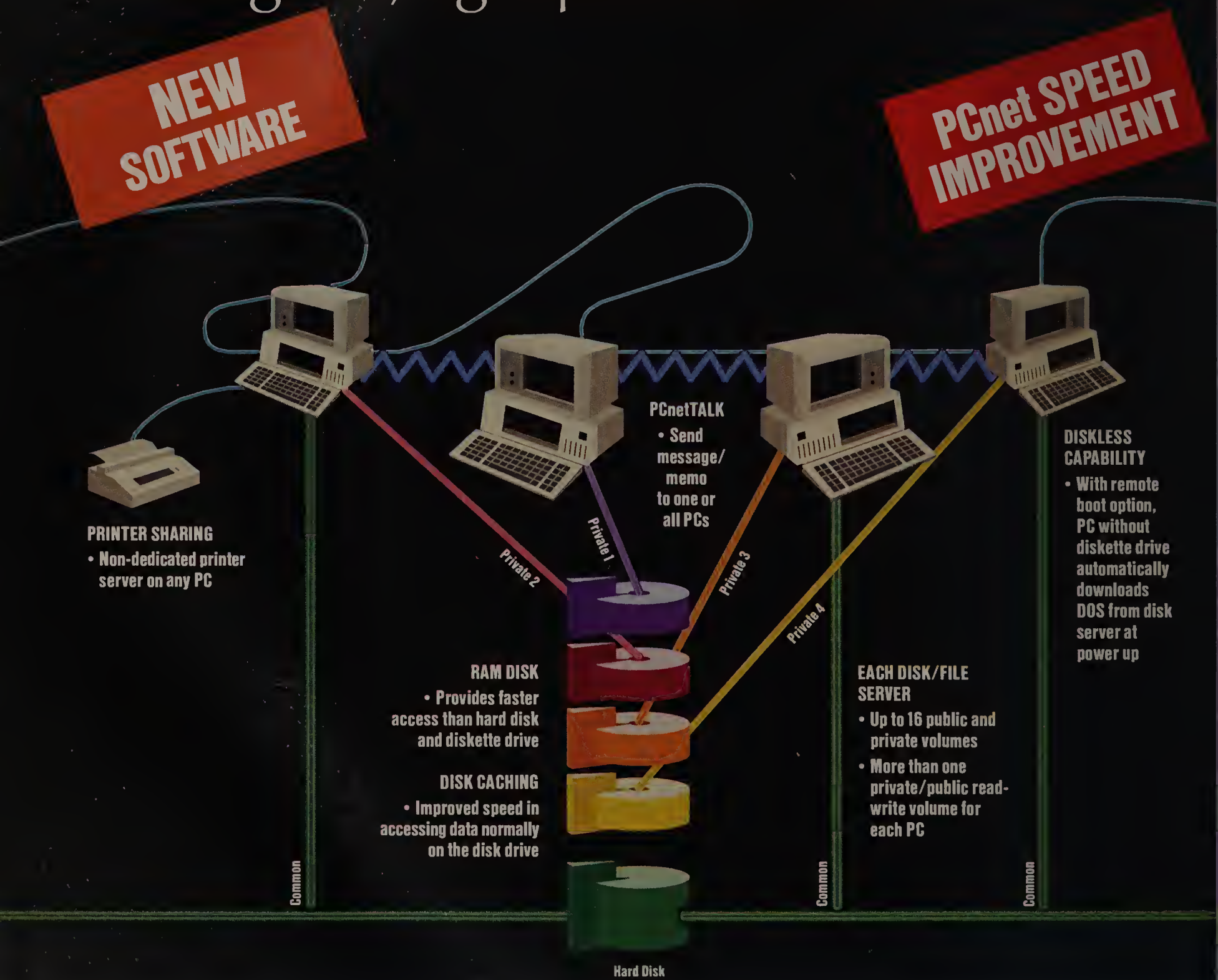

PCnet is the lowest cost network for IBM™ PCs. Take your choice.

$495 per node when purchased as a stand-alone.
$395 per node when purchased with BLOSSOM (384K RAM, Clock, IO)

Orchid, the creator of PCnet, has made high-performance local area networking affordable to all PC users. Contact your local dealer or Orchid today to unlock the power of your IBM PC and find out more about our full line of products.

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ORCHID

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Available for IBM PC

What C did for Programming Mark Williams has done for C Programming

The C Programming System from Mark Williams

MWC86 gets your C programs running faster and uses less memory space than any other compiler on the market. Then *csd*, Mark Williams' revolutionary C Source Debugger, helps you debug faster. That's The C Programming System from Mark Williams Company.

MWC86

MWC86 is the most highly optimized C compiler available anywhere for the DOS and 8086 environment. The benchmarks prove it! They show MWC86 is unmatched in speed and code density.

MWC86 supports large and small models of compilation, the 8087 math coprocessor and DOS 2.0 pathnames. The compiler features common code elimination, peephole optimization and register variables. It includes the most complete libraries. Unlike its competition, MWC86 supports the full C language including recent extensions such as the Berkeley structure rules, voids, enumerated data types, UNIX* I/O calls and structure assignments.

Quality is why Intel, DEC and Wang chose to distribute MWC86. These industry leaders looked and compared and found Mark Williams to be best.

User Friendly

MWC86 is the easiest to use of all compilers. One command runs all phases from pre-processor to assembler and linker. MWC86 eliminates the need to search for error messages in the back of a manual. All error messages appear on the screen in English.

A recent review of MWC86 in *PC World*, June, 1984, summed it up:

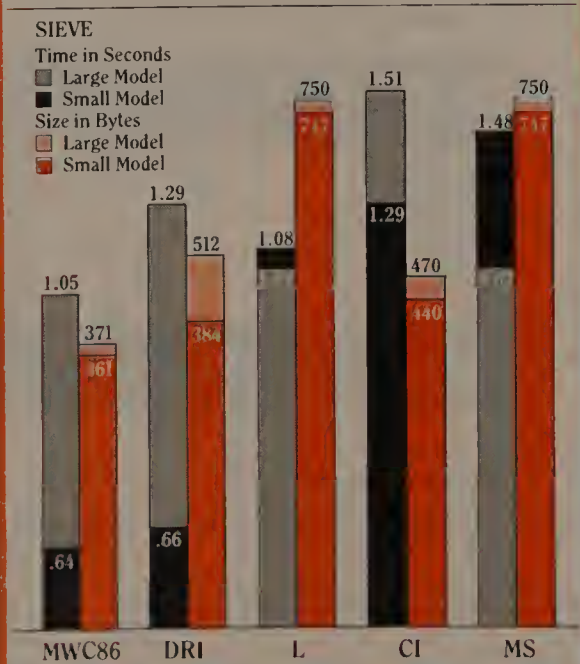
"Of all the compilers reviewed, MWC86 would be my first choice for product development. It compiles quickly, produces superior error messages, and generates quick, compact object code. The library is small and fast and closely follows the industry standard for C libraries."

csd C Source Debugger

Mark Williams was not content to write the best C compiler on the market. To advance the state of the art in software development, Mark Williams wrote *csd*.

csd C Source Debugger serves as a microscope on the program. Any C expression can be entered and evaluated. With *csd* a programmer can set tracepoints on variables and expressions with full history capability and can single step a program to find bugs. The debugger does not affect either code size or execution time. *csd* features online help instructions; the ability to walk through the stack; the debugging of graphics programs without disturbing the program under test; and evaluation, source, program and history windows.

csd eases the most difficult part of development — debugging. Because *csd* debugs in C, not assembler, a programmer no longer has to rely on old-fashioned assembler tools, but can work as if using a C interpreter — in real time.



The C Programming System from Mark Williams now supports the following libraries:

Library	Company
Windows for C	Creative Solutions
Halo	Media Cybernetics
PHACT	PHACT Associates
The Greenleaf Functions	Greenleaf Software
Btrieve	SoftCraft

The C Programming System from Mark Williams

The C Programming System from Mark Williams delivers not only the best C compiler for the 8086 but also the only C source level debugger. That's why it does for C programming what C did for programming. The Mark Williams C Programming System gives the programmer the MWC86 C compiler and the *csd* C Source Debugger for only $495. Order today by calling 1-800-MWC-1700. Major credit cards accepted.

Technical support for The Mark Williams C Programming System is provided free of charge by the team that developed it.

Mark Williams Company
1430 W. Wrightwood Ave.
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The Graphics Gallery

Even novices can create and control presentation-quality business graphics with Microsoft Chart. Choose a graph type from a preprogrammed "gallery" and adapt it to fit your needs.

Steve Lambert

Charts and graphs bring numbers and other abstractions to life. Until recently, only computer users with substantial programming expertise and access to mainframe systems could produce anything but the most rudimentary charts. Now, as desktop computers become more powerful and software more sophisticated, even novice users are creating charts that tell stories vividly.

If software industry sales projections are on target, the graphing of America is going to be big business during the next year. In introducing *Chart,* Microsoft is adhering to a pattern established with its spreadsheet and word processing programs: let other software developers break new ground, observe the weak points of their programs, and then create a package that attempts to plug the gaps.

Microsoft Chart is designed to appeal to a broad range of users—from the individual familiar with charting standards and well versed in chart creation to the beginner with a job to do. *Chart* is reasonably easy to learn and use, and it contains features that are both powerful and versatile.

Pictures at an Exhibition

At its best, a charting program should allow you to try out a variety of chart formats on screen before committing one to paper. To achieve such flexibility, the program must be capable of rapidly switching among various types of charts. *Chart* does so by providing 45 preprogrammed charts, distributed among eight groupings—area, bar, column, hi-lo, line, mixed, pie, and scatter—in what Microsoft calls a "gallery" (see Figure 1). These miniature renderings of each major chart style are complete except for the values that you supply. There's no need to create a chart from scratch; you simply start with a sample from the gallery and manipulate it to your specifications.

Once you've selected the style best suited to your data, you can play with the format, that is, the way in which the values are expressed. Under the heading "Formats" are labels, titles, colors, fill patterns, line patterns, markers, grids, and the like. The gallery displays a broad range of formatting possibilities; if you select the pie chart option, for example, you can choose from six variations on that

18%
9
10
11
Marketable Securities
Cash

style. Your choice of format does not change the data; it merely affects how that data is conveyed visually. Formatting is a matter of fine-tuning a chart.

Getting Started

When you start the program, you're in *Chart*'s List mode—one of three basic modes of operation, along with the Entry and Chart modes. You can move rapidly between modes by pressing the first letter of the mode you want. The three modes include a host of commands that enable you to enter information, display it in chart form, alter or augment the data, and immediately see the effect of your modifications on the chart.

The typical chart-creation routine takes you from the List mode to the Entry mode. Before moving to the Chart mode, you'll usually want to view the gallery. Once in the Chart mode, you'll generally manipulate your creation by invoking various format commands.

The Entry mode allows you to type in data. To create a chart, data must be plotted using ordered pairs on a standard *X-Y* axis. Each ordered pair defines one "data point." A data point could consist, for example, of the name of a state and the population of that state, or a year and the consumer price index for that year. When you type in data points on the Entry screen, the program displays your entries in two columns—one for "category," one for "value." *Chart* accepts a maximum of 512 data points per chart.

The entire collection of data points that makes up a set of bars, a line, or the pieces of a pie is called a "data series." From the List screen, you can specify which series should be included or excluded when the chart is drawn. Because it contains all the data series, the List mode performs a kind of housekeeping function.

The Chart mode puts data in graph form. If you've entered data and want it displayed in the format of one of the miniature charts from the gallery, the program will comply in seconds, plotting the information according to your formatting instructions. If you're not satisfied with your initial choice, you can try other styles.

When a chart approximates what you want, you can edit it while you're in the Chart mode. Every aspect of the format—which essentially means every element of the chart—can be modified. You can add text and move it around; add an arrow and stretch it from one point to any other point; add a legend and then change its size, shape, and location; and even add additional charts to the same page. You can take advantage of the last feature by dividing the screen into quadrants (or even smaller sectors), using the List mode to retrieve charts that you've already created, and then scaling the charts to the desired size. As many as 16 charts can be displayed on a single screen, arranged neatly in rows and columns or scattered about.

You can easily add text to any chart; you can even assemble a chart consisting exclusively of text. *Chart* offers a dozen different

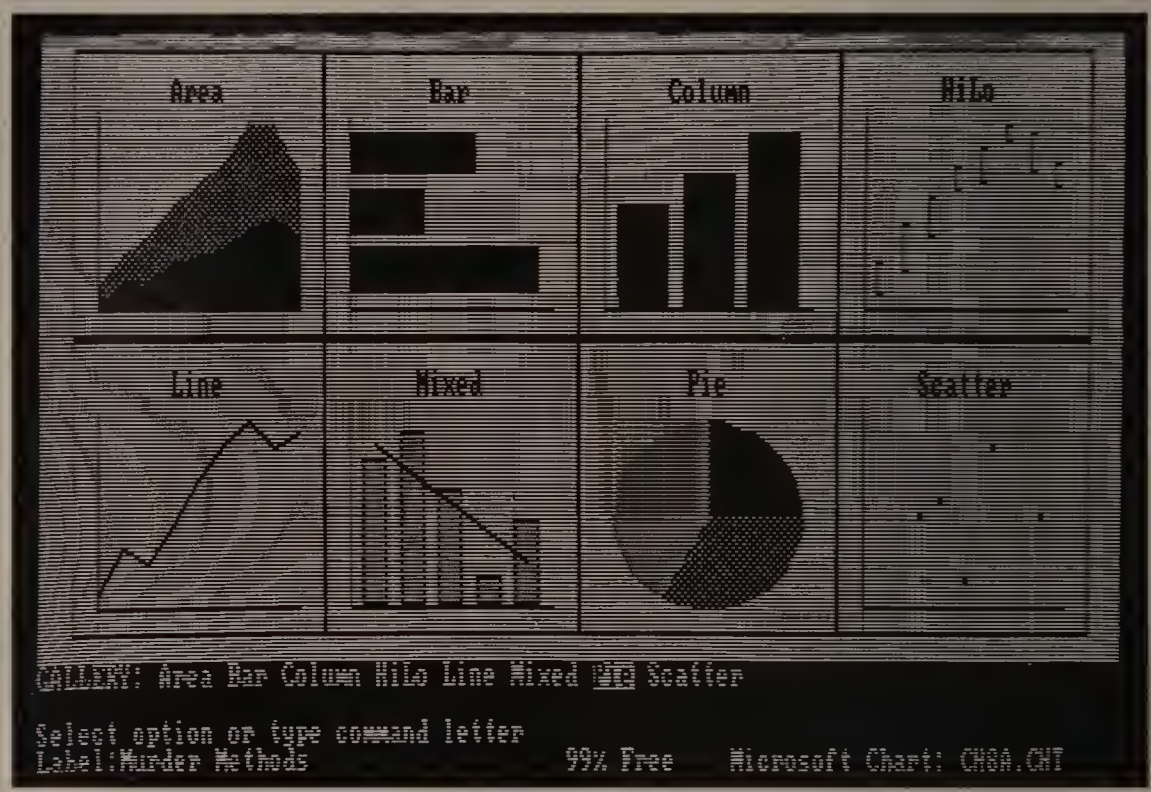

Figure 1: The Chart gallery features eight major chart types.

As many as 16 charts can be displayed on a single screen, arranged neatly in rows and columns or scattered about.

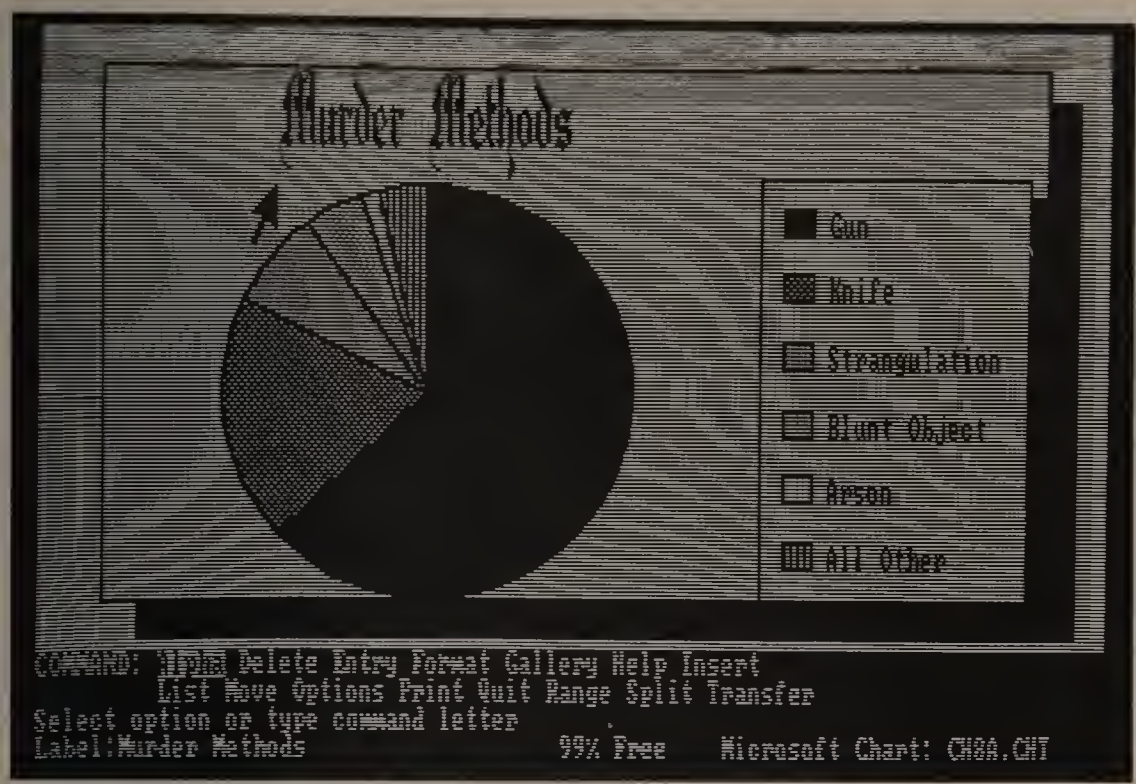

Figure 2: A screen from the Chart mode. While in that mode, you can manipulate any element of a chart.

fonts of varying sizes. Unfortunately, you can't merge *Chart* graphics and a word processing file.

Once you've practiced selecting an element of a chart and then choosing the command to modify it, on-screen chart editing becomes fairly rapid (although this is one area in which a mouse could speed things up even more). If you're currently creating charts by hand or with another program, you'll appreciate this ability to precisely and quickly tailor a chart to your needs.

Dividing the Screen

If you're familiar with *Microsoft Word* or *Multiplan,* you'll probably feel right at home with *Chart,* which partitions the screen in the same manner: into a work area, a command menu, a message line, and a status line. (Figure 2 shows a screen from the Chart mode.) The chart that you're creating or modifying occupies the upper portion of the screen. Near the bottom is the command menu. The message line, located immediately below the command menu, displays prompts for various actions (such as 'enter file name') or error messages (such as 'you cannot apply that command to the selected object').

The status line occupies the bottom line of the screen. While you're in the Chart mode, the status line displays the name of the chart element you're currently working on, such as the caption or the legend. Whatever the mode, the status line indicates the percentage of available RAM, which varies because *Chart* sets aside the portion of RAM needed for data manipulation. This feature serves as a good reminder to save your work periodically.

Automatic Plotting

If you want to plot a recurring or predictable event (such as closing stock prices), *Chart* enables you to specify ahead of time the category part of the beginning data point, the increment of change, and the unit of measure. The program will automatically enter the specified information (for instance, the time element) in the left column; you need only supply data for the right column. For example, suppose you were plotting the closing prices of the Dow-Jones industrial average during a week's time; you would note that the average is measured each weekday, and you might begin on Wednesday, June 20. *Chart* would provide the weekday labels Wednesday, Thursday, Friday, Monday, and Tuesday. This feature can be invoked from the Name command in either the List or the Entry mode.

When the chart looks right, you can save it with the Transfer Save command. This command saves both the formatting information and the data. If you load that chart again, you can load the format alone, just the data, or both. In effect, you can create your own list of standard formats that will display information just as you need it. You can enter new data, load an old format, and choose the Chart mode from the command menu, and *Chart* will plot the new data in the style that you created on a previous occasion. Your list of formats, however, does not constitute a gallery; that is, you can't view your list as an additional series of miniature charts.

Willing to Help

The Help command, which is available from all three modes, leads you through a condensed version of the documentation. The help screens are both constructive and extensive, occupying a 60K file on the program disk. Choosing help in the conventional way–by typing H or highlighting the word 'help' on the command menu and pressing <Enter>–summons the submenu shown in Figure 3. This allows you to wander through the help file a page at a time or jump to the beginning of various major sections, such as those defining every key the program uses and every command you can invoke.

You can also obtain help for a specific command by highlighting that command on the main menu and then pressing <Alt>-H. Relying on help screens and the message line, you can probably learn enough about *Chart* to get by without even cracking the documentation.

The Multiplan Connection

If you use Microsoft's *Multiplan* to keep track of inventory information or any data that requires routine updates, a chart based on that information can be linked to the spreadsheet in which the updates are maintained. Each time you load the chart, *Chart* will open the spreadsheet file and retrieve the updated figures.

Data can also be brought in from other popular programs, among them *dBase II*, *VisiCalc*, and *1-2-3*, although making connections with these programs is not as easy as making connections with *Multiplan*. For the two Microsoft products, the process is streamlined: *Chart* and *Multiplan* share a common language. *Chart* includes a program that permits quick and simple two-way conversion between other formats. That conversion program, called CONVERTD, allows data to be imported from programs other than *Multiplan* as well, but formatting information is not apt to make the trip intact.

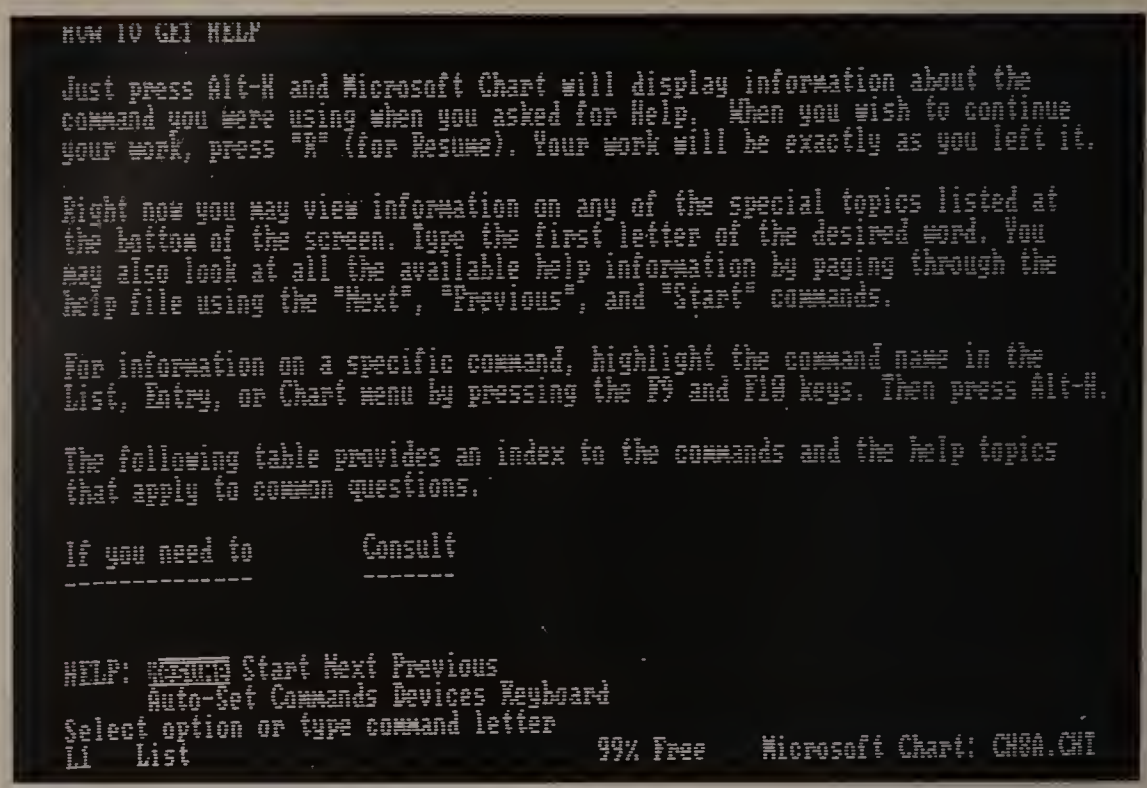

Figure 3: The opening help screen from Chart

From Screen to Page

Chart makes particularly good use of printers and plotters. The Print Options command permits you to send a chart to any of a number of output devices. Highlighting this option on the command menu displays a list of all installed output devices. Highlighting the name of one of these devices and striking the <Enter> key designates it as the current output device. Changing the output device causes the menu options that pertain to the device to change accordingly.

If you specify an Epson printer, for example, and choose the Format Color command for some element of the chart, the only color listed is black. Changing the output device to an IDS Prism brings the list of available colors to seven, in accordance with that device's capabilities. The Print Options menu also allows you to set such variables as plotter pen speed and line thickness.

Character sizes, shapes, and relationships occasionally differ as you move from the PC's display to an output device. The Option command on *Chart*'s menu allows you to display the chart on the screen as it would appear on a

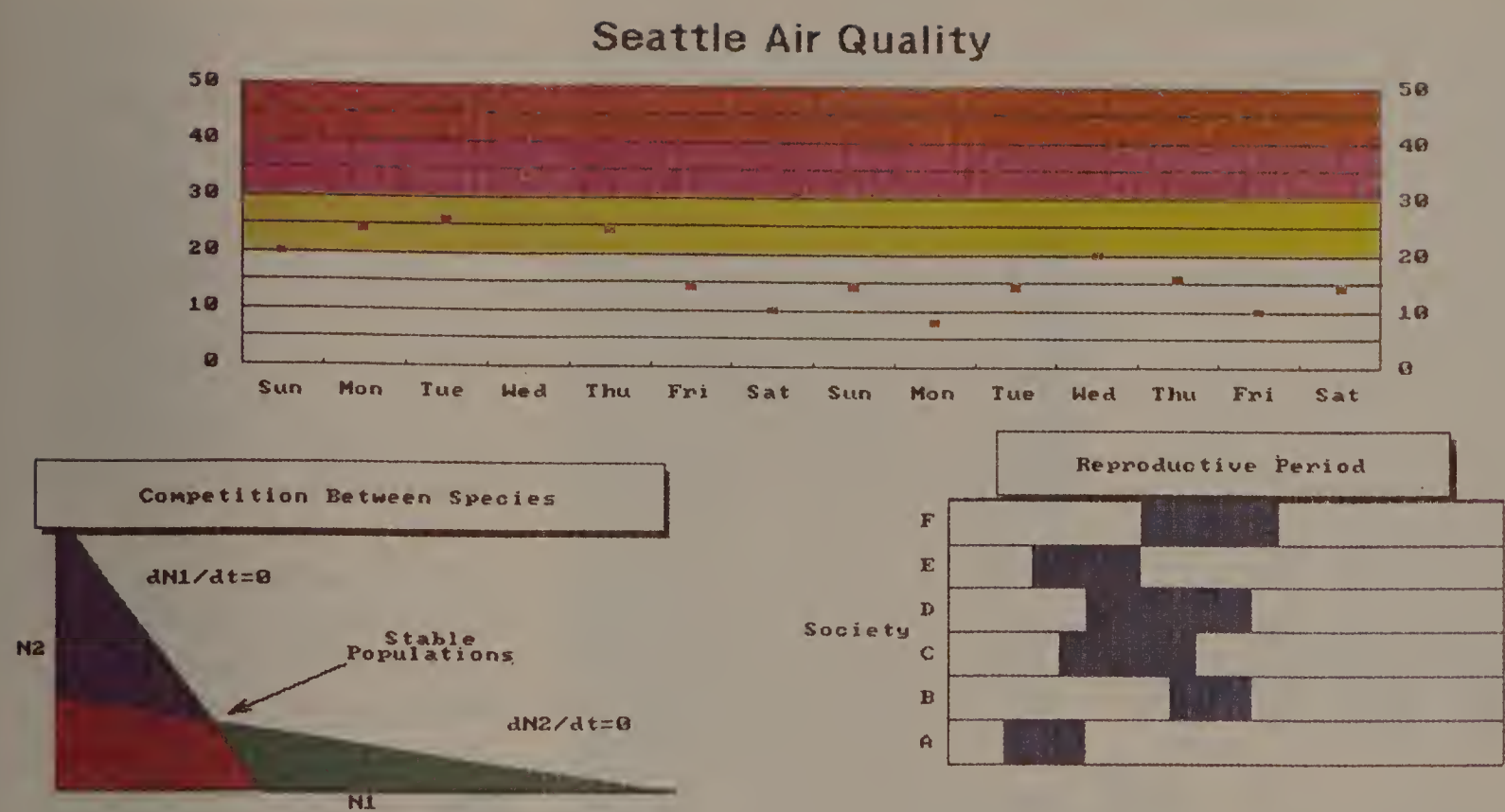

Figure 4: Plotted output from Chart displays the range of colors and fill patterns that the program supports.

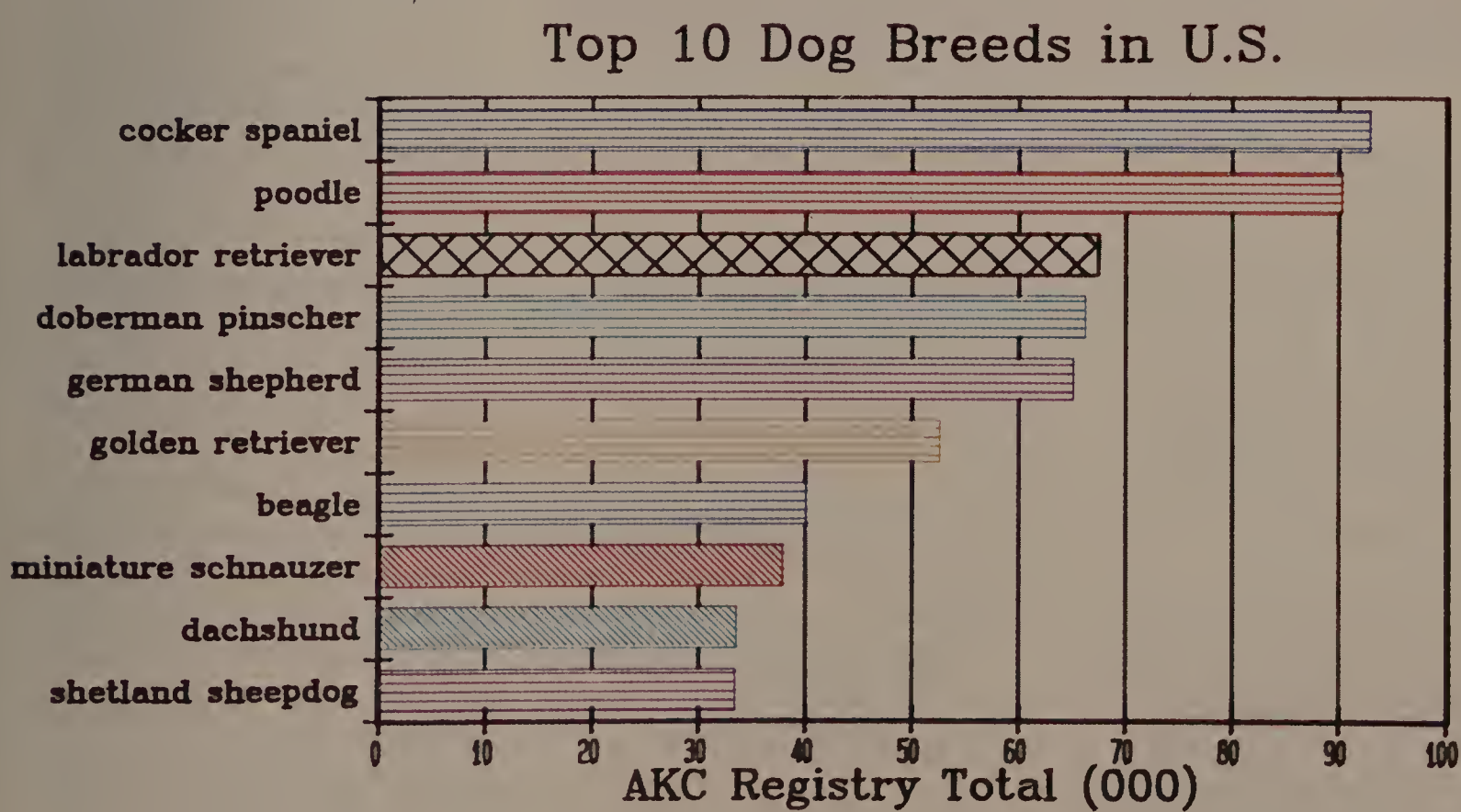

Figure 5: Printed output from Chart

plotter or printer. This permits you to compensate for any differences in display capabilities.

Obviously the quality of the hardware has much to do with the appearance of the final product. The quality of plotted output is shown in Figure 4 and printed output in Figure 5.

What You Get

Three disks are included with *Chart*: one is a copy-protected program disk, the second a backup copy of the first, and the third an unprotected disk containing various fonts that you can load into the program. The program runs on the IBM PC, the XT, and several compatibles. I ran it successfully on a Compaq.

Whatever your computer, you need an IBM Color/Graphics Adapter or a Hercules Graphics Card. The Hercules board enables the program to produce an extremely sharp image on an IBM Monochrome Display.

Documentation Overload

At nearly 500 pages, the documentation on *Chart* is massive. A third of the manual is devoted to an alphabetical listing and explanation of every command. For all its bulk, however, the documentation does not include a sufficient number of examples of sophisticated charting applications.

A short section at the front of the book walks you through the process of adding system and command files to the program disk, explains the PC keyboard, and offers general information about DOS. This is followed by a 75-page tutorial that demonstrates how to load and view a sample chart included on the program disk and leads you through the creation and modification of another chart. If you follow along carefully, it should take about an hour for you to begin creating reasonably sophisticated charts on your own. The tutorial's use of generic key names—such as "word right," "word left," and "newline"—is a bit confusing. It frequently forced me to refer to a keyboard legend before striking the correct key.

The documentation's appendices are somewhat esoteric, but should appeal to the more technically inclined. They feature a complete explanation of Microsoft's SYLK (symbolic link) file format, the company's standard method of storing information. The SYLK format creates readable text files that contain the various attributes of the data you've stored—in this case, charts. Because the format is so accessible, SYLK serves as a convenient point for sharing *Chart* data with other programs.

The appendix also contains information about the CONVERTD program—which is included on the program disk and allows two-way conversion between ASCII, .DIF, *dBase II*, and SYLK files—and a brief section on creating your own fonts and loading them into *Chart*.

Data can be brought in from other popular programs, among them dBase II, VisiCalc, *and* 1-2-3, *although making connections with these programs is not as easy as making connections with* Multiplan.

Weaknesses and Wishes

Much to its credit, Microsoft has incorporated into its program default settings that reflect generally accepted graphics and charting standards. But if you want to depart from a standard or embellish what the company gives you, *Chart* will respond well.

In its incarnation of *Chart* for Apple's Macintosh, Microsoft takes advantage of the Mac's cut-and-paste feature, which permits easy and convenient meshing of charts and word processing files. I'm eagerly awaiting a similar windowing capability for the PC.

Microsoft's promotional material lists certain weaknesses in *Chart* when comparing the program to leading competitors. *BPS Business Graphics*, for example, has more built-in statistical functions than *Chart*'s seven, and supports more than the 30 printers and plotters that work with *Chart*. *Chart* is also unable to perform sequenced presentations or slide shows. I don't consider this a major weakness, however. For my money, you can create a far better sequenced presentation by plot-

ting the charts on transparency material, then displaying the results with an overhead projector or converting them to slides.

The program would be even better if text could be displayed with more flexibility. Legends along the *Y*-axis can be displayed horizontally or vertically, but the latter means stacking letters vertically. Microsoft's rationale is that you should never have to turn a chart sideways to read it. But *Chart* would be a better program if there were a choice between stacked or rotated vertical legends.

To my wish list for this basically fine program, I'd add a few more things: support for an excellent color graphics board; support for a good slide generation system; a "paint" mode that would allow freehand drawing and pictographs; and support for a mouse to select and move objects. But given its sensible and versatile approach—and its $250 price tag—*Chart* is probably the best available value in a charting program.

Steve Lambert is a freelance writer and the author of Presentation Graphics on the IBM PC.

Microsoft Chart
Microsoft Corp.
10700 Northup Way
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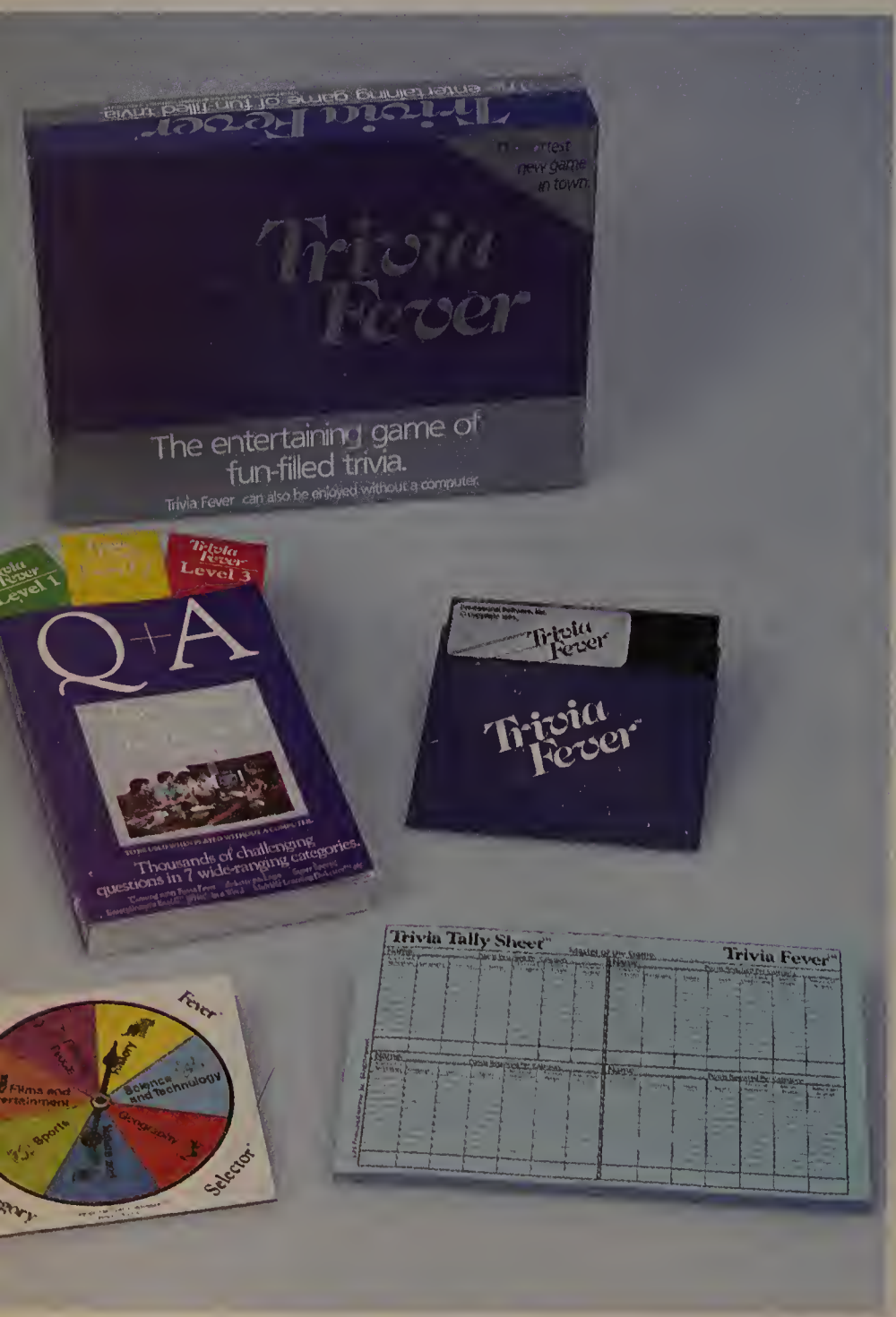

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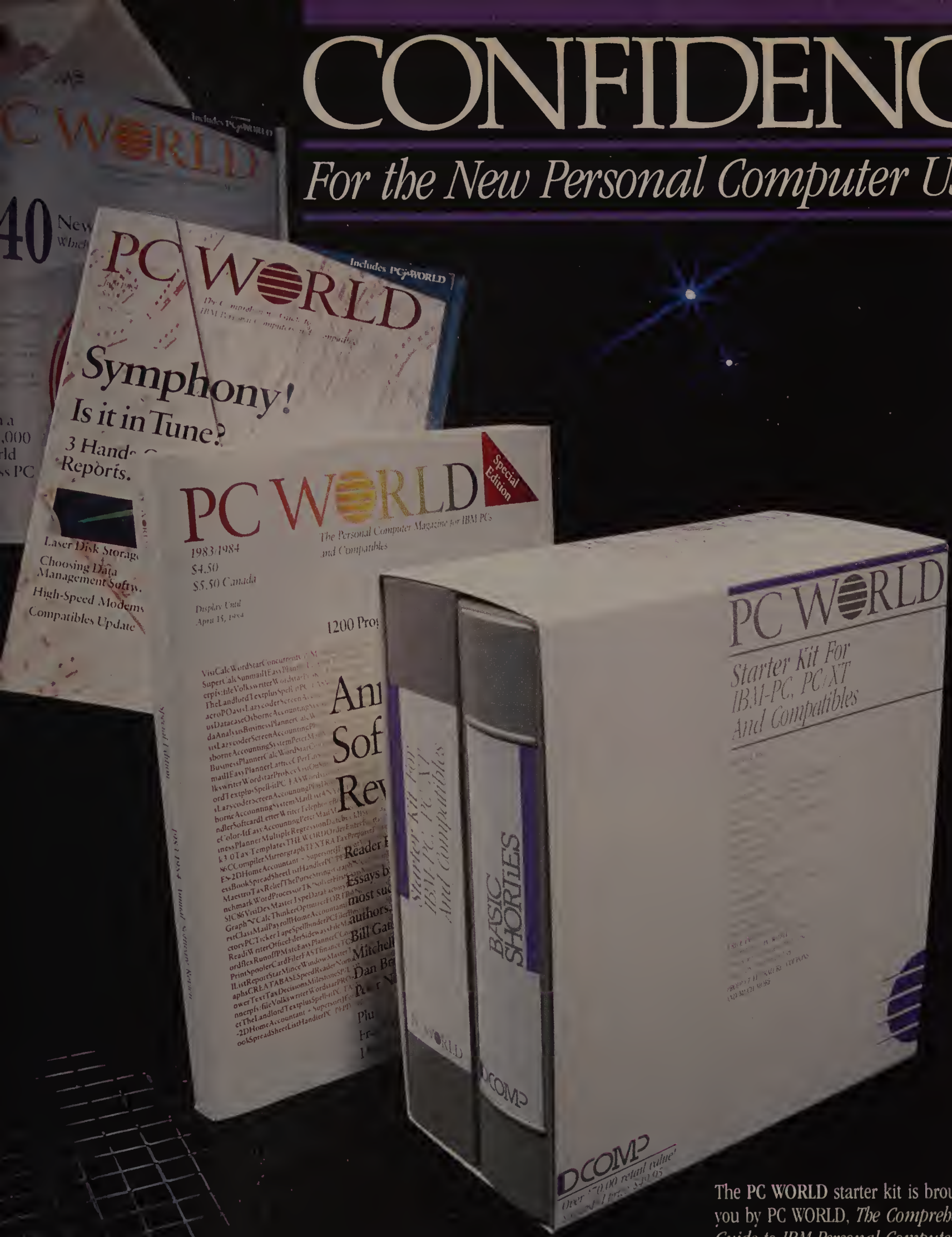

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Circle 278 on reader service card

From the Software Shelf

PC World editors offer first impressions of recent software releases.

To help with Christmas shopping for the family that computes together, we look at recreational software products: computerized versions of chess, cribbage, and twenty questions and an underwater adventure simulation game.

From the Software Shelf samples a small portion of the software flooding the PC market. These reviews, written by the staff of *PC World*, provide a brief glimpse of new word processors, spreadsheets, data base management programs, utilities, tutorials, and other products, including new additions to established software families that might otherwise be overlooked. These impressions are not intended to take the place of full-length reviews of the products but rather to keep you informed of new products that we think will be of interest. *From the Software Shelf* examines programs for ease of use and installation as well as for the strong features or significant weaknesses of these contenders for software fame.

The Right Move

There are skeptics out there, so I've heard, who are aghast at the automation of games that have long served as a crucible for the human mind. These age-old battles of wits, the thinking goes, have been cleansed of the dimension (let's politely call it human conflict) that has made them such potent diversions.

Rubbish. I'm here to tell you that the capacity to be humiliated at chess—a talent I possessed in spades during my playing days—can come as easily at the stacks and registers of a microprocessor as at the hands of a truly skilled (and wretched) friend. I'm thoroughly convinced that *ChessWright*, the callous perpetrator in question, would be a terrible loser. If it ever lost.

ChessWright is polite but unnerving. The problem is the program's built-in clocks—one for each player—which monitor total elapsed time for all moves. This feature hectored me from Game One.

As I plumbed every cranial cavity, sorting and discarding options, the machine methodically ticked off the seconds, then the minutes—a subtle hint that one of us was frightfully slow. *ChessWright* invariably responded with lightning moves—scant hesitation, little apparent indecision, absolutely no trembling. As this pattern repeated itself, I began to find solace in anything less than an instantaneous response to one of my moves. When the machine grappled with a gambit— spending, say, all of 15 seconds before humbling me—calculation time itself became reason for glee. (Better a Pyrrhic victory than none at all.)

If you're a chess buff or merely a bold beginner, *ChessWright* could be the Boris Spassky of your dreams (or nightmares). Like other chess packages, *ChessWright* provides a dynamic way to play the game. Its various bells and whistles manage to add a surprisingly human element to the machine's imperturbable exterior. On top of all that, it likes to win.

ChessWright is both easy to learn and easy to use. You won't need to spend much time deciphering the program; it will serve you well as a learning, or polishing, tool.

Moving pieces is a snap; you can rely on chess notation or the cursor keypad. *ChessWright* notes and plays castling and en passant moves. Although the default skill level is 2, or "average," there are seven degrees of difficulty from which to choose. Should you suddenly feel the old courage re-emerging, you can change levels midgame, from blitz/novice (in which the program takes a second or two to move) to master (an hour or two) to postal chess (virtually days). I recommend that you reverse this strategy if you're feeling a sudden tinge of uncertainty amid a shellacking by a lifeless box of printed circuitry and wires.

Whatever your predicament, on-screen assistance is always available. If you're stumped in midgame, you can prevail upon *ChessWright*'s "hint" facility for guidance (although you may need convincing, as I did, that it's not just a devious ploy). Grieving over the loss of your queen to that pawn you neglected to notice? Strike the TakeBack command, and don't tell a soul.

ChessWright's command menu is simple and yields a panoply of features that can't help but improve your game. Games can be saved and restored later for completion or replay. You can display a history of the game on the screen while the game is in progress, or you can print it out later. *ChessWright* will play itself in demonstration mode, or it will sit on the sidelines, enabling two human beings to duke it out while the machine serves as scribe. The program allows you to set up special problems or games and then designate the PC to play either or both sides. Yet another option enables you to replay historic games from a disk-based library of the best of Bobby Fischer, Larry Evans, and others.

If you really like getting riled, you can add sound to the ticking clock, keep tabs on the number of moves, or ring a bell with each move. If your machine sports a graphics board, you can vary the color scheme of the chessboard.

But the board, unfortunately, is *ChessWright*'s single, glaring weakness. Screen definitions of the pieces are abysmal. Pieces of the same color are difficult to distinguish from each other. Even discerning white from black isn't always easy. Images are crude; a shaft of illuminated pixels is all that separates white from black.

Other than the spartan appearance of the pieces, however, *ChessWright* promises a good tussle, especially if you're rusty. SoftWright Systems, the folks who developed the program, claim that *ChessWright* works two to three times faster on an 8086-based machine. I used a Leading Edge PC equipped with a fairly quick 8-MHz 8088, so I feel slightly redeemed. My advice is to be merciful with yourself: stick to a regular 8088.–KG

ChessWright
SoftWright Systems
P.O. Box 3208
Durham, NC 27705
919/383-4441
List price: $50
Requirements: 64K for DOS 1.10, 128K for DOS 2.00, one disk drive

Cribbage Partner

The introduction of the card game cribbage is credited to the English poet and soldier Sir John Suckling. According to Tailored Data, the manufacturer, Suckling used the basics of an earlier game called noddy to develop "cribbidge" sometime between 1632 and 1639. Since Mr. Hoyle writes about rules and not history, we will have to take Tailored Data's word for the game's beginnings.

My introduction to the game came from two pros, my grandfather and great-grandfather. My grandfather, a canny Scot, developed his playing acumen during cold winter evenings on Prince Edward Island. My great-grandfather left his Missouri home at age 11 and eventually made his way to the California gold fields; he soon discovered he could make more money at a gambling table than at a river sluice. These two men were *card players,* and they elevated cribbage to an art form.

Cribbage Partner keeps track of the scores as you play the game.

Needless to say, with my background I expected a lot from Tailored Data's *Cribbage Partner,* a cribbage game that pits a player against a computer. The game's main menu offers four selections: History, Rules, Strategy, and Cribbage Partner. The Rules section is clear and concise, with well-written explanations. The Strategy section explains which cards to put in the crib, which cards to play, and how to get the most pegging points. The section includes many good tips (some of which echo my grandfather's admonitions to me), takes you through two cribbage hands, and lists five recommended books on the card game.

When you choose the fourth option, Cribbage Partner, the game asks you to select your level of play: Novice, Beginner, Intermediate, or Advanced. Once you make your selection, the game begins. The object of cribbage is to be the first player to peg, or score, 121 points. In place of the traditional wooden cribbage board where points are pegged, the program keeps a running total of the score. The cards in your hand are shown on the screen, but the computer's cards are kept face down until they are played. Like a regular cribbage game, the deck is cut for a starter (card) at the beginning of each hand. You choose which cards to discard into the crib and which to lay down during the play. However, unlike a regular game in which each player counts his or her points during the play, the program calculates every pegging point. *Cribbage Partner* also counts up the points in all hands and cribs. The game's counting ability is efficient and always mathematically correct, but I did miss the old "15-2, 15-4, 15-6 . . . " cant. I beat the computer in our first game, so I won't complain too much.

Cribbage Partner is a well-designed game that can both challenge experts and initiate beginners. Unlike a maze or shoot-'em-up space game, you can't memorize a pattern and score an easy win with *Cribbage Partner.* Cribbage, whether old-fashioned or computerized, depends on the luck of the draw and your playing ability, so each game is different–that's why it's fun. The computer and I are, at present, tied in our matches.

Although *Cribbage Partner* will never give me as good a crib game as my grandfather did, it is a worthy opponent.–KS

Cribbage Partner
Tailored Data, Inc.
4940 Viking Dr. #558
Minneapolis, MN 55435
800/328-5551
List price: $29.95
Requirements: 96K, one disk drive

Seastalker

I had a rough day at the office playing Infocom's new underwater adventure game, *Seastalker*. I ran my submarine into a ship, severely gashed my arm crawling around in the engine compartment, and couldn't find the tool to fix the air supply while my colleagues slowly suffocated around me. Then I was forced to ferret out a traitor and venture forth to battle a mad scientist and his genetic invention, a huge sea monster called a Snark. Nobody said that reviewing software was easy.

A good adventure game draws you in, warps your reality, and makes you believe you are there. Even as I write this article I can taste the stale air from being cooped up in a tiny submarine with my ever-present copilot, Tip. Tip follows you around wherever you go in this game. Sometimes you can order Tip around, but usually he tells you to do it yourself. After a while you get a little tired of Tip.

Seastalker's scenario starts off with dramatic simplicity but gets more complex as you go along: You're an oceanographer working at a research laboratory on Frobton Bay when a message comes in over the videophone from an underwater research station, the Aquadome. A mutant sea monster is attacking, and the dome won't be able to withstand the stress much longer.

You and Tip jump into your trusty submarine, the Scimitar, and try to navigate out of Frobton Bay and make your way to the Aquadome. The plot thickens at the Aquadome when certain traitors rear their ugly electronic heads. Then it's a matter of gathering up the proper tools, clues, and weapons and taking off to kill the Snark.

If you're not well prepared, it can get boring out there on the high seas. Time doesn't pass in this game. Events occur only in response to a certain sequence or number of commands that you type. Depending on what reality you've created for yourself, you could go submarining along forever without finding the Snark. Don't rush off after the Snark until you've spent a good deal of time at the Aquadome picking up clues. Once you're out on the seas you can think about things all you want, but there's not much to do. After a while you get tired of checking the sonar depth and asking Tip questions he refuses to answer. Desperately bored, I took to kissing various tools and electronic instruments. Now I see why sailors begin to lose their minds while living in submarines.

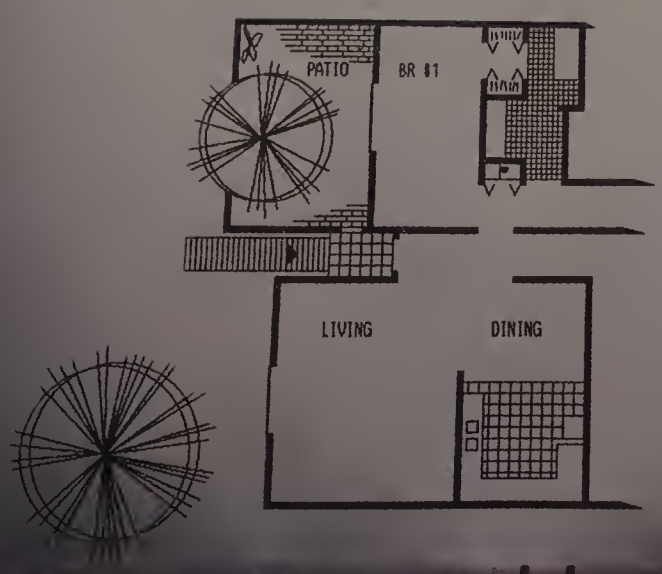
Seastalker is the first in a series of Infocom titles that are designed with the beginner in mind. If you've ever struggled in frustration with adventure games that refuse to accept your input, you will appreciate *Seastalker*'s 800-word vocabulary and the variety of friendly messages that greet syntax errors. Also helpful is the option to save your story to disk at any time so that you don't have to go back to the beginning if you stop in the middle of a game.

Although designed for players age 9 and older, the game is sufficiently complex to challenge an intelligent adult. As with any good interactive game, *Seastalker* can be played many times before you get bored with it. Even if you manage to kill the Snark, you can continue to challenge yourself by improving your score. The score is figured from the ratio of stupid moves (such as kissing a hydrophone) to smart moves (such as solving a puzzle).

Like most of Infocom's interactive fiction games, the narrative, by Jim Lawrence and Stu Galley, is colorful and well written. When you are in the Scimitar, the on-screen type is broken up by a helpful sonar map. Infocom also did a superb job of packaging. *Seastalker* comes with several maps, a logbook, a decal, and even some "infocards" that contain hints you can read by inserting them into a red rubylith decoder.

I won't tell you the exciting conclusion because I never did manage to catch the Snark. I'm still out there kissing my submarine.—EB

Seastalker
Infocom, Inc.
55 Wheeler St.
Cambridge, MA 02138
617/492-1031
List price: $39.95
Requirements: 48K, one disk drive



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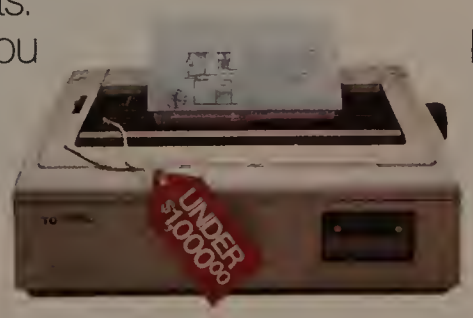

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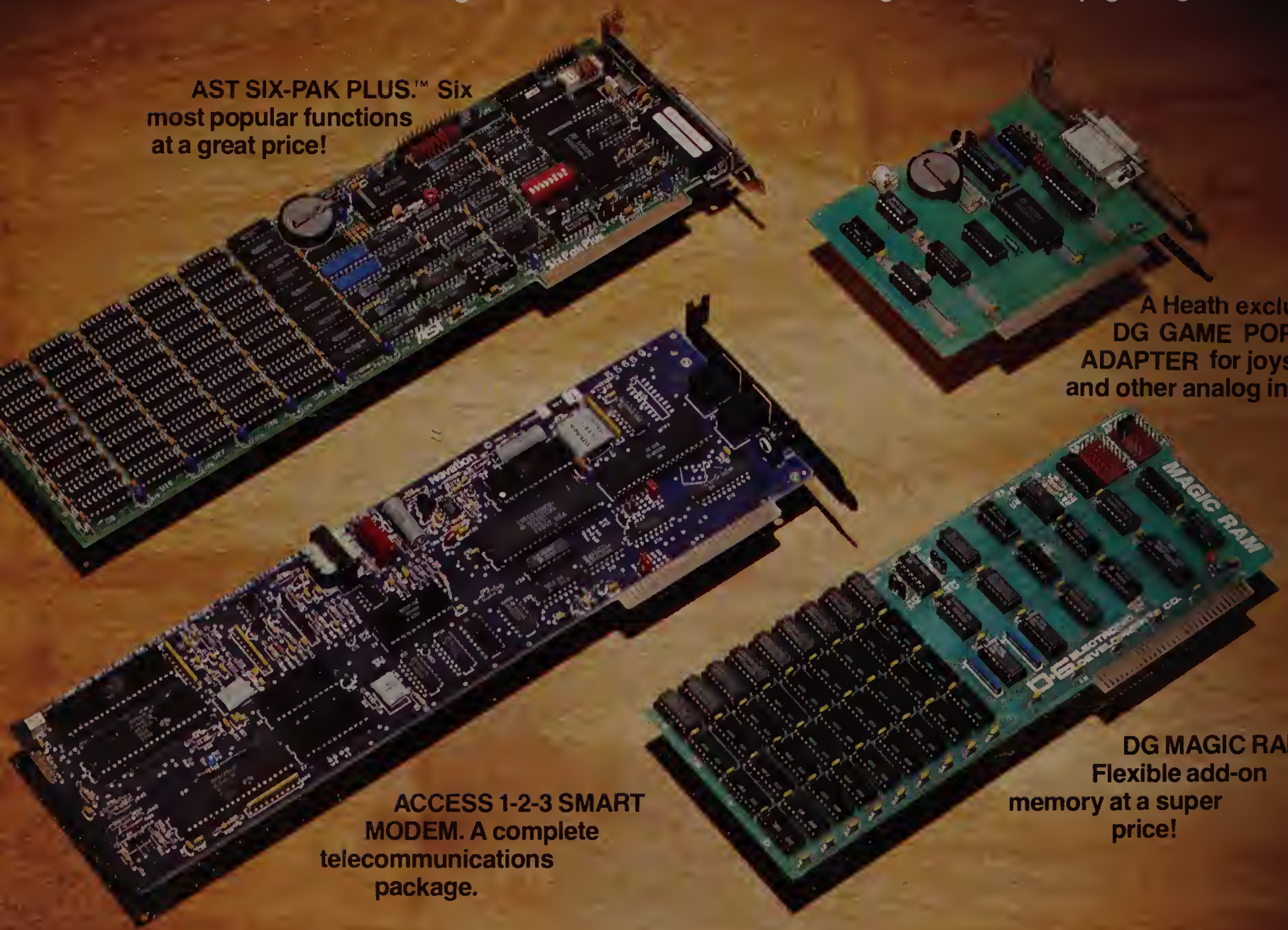

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Question

I remember summertime vacations when seven of us crowded into the family station wagon for a long drive across the country to visit relatives. By the second day, with a child's sense that time and distance are infinite, I was squirming with boredom. At this point we always played the game twenty questions, in which my younger sister would think of an object and I had to read her mind. "Is it bigger than a breadbox?" usually began my brilliant cross-examination, followed by the probing "Is it animal, vegetable, or mineral?"

Alpha Software Corporation has converted this familiar pastime into an educational game for adults and children. The new twist is that *Question* deduces the object of your choice by asking you a series of questions such as "Does this animal have flippers or fins?" and "Do its front teeth grow constantly?" Your job is to know your facts (that's the educational angle, in case you were wondering) and correctly answer yes or no. Assuming the item is in the game's data base, *Question* will usually divine the object after no more than eight questions.

Question's data base has 500 items that fall into three categories: Animals, Cities of the World, and Famous People. The game's outstanding feature is that you can create a data base for any skill level by adding or deleting questions, items, and categories. After the program disk is full, you can switch to a second data disk to store additional items. A special feature lets you review the list of items in the data base.

For the sake of anyone new to computers, Alpha Software has bent over backwards to ensure that there are no problems in playing the game. *Question*'s simple design makes it easy to play without instruction, but the documentation includes a detailed tutorial anyway. Erring on the side of caution, Alpha Software also provides an instructional cassette tape that talks you through the tutorial, a unique approach in games software.

Question's major selling point as an educational game is that it won't get boring because you don't stop learning. The bonus is that *Question* is simple to learn and use. Best of all, if you have a lap-size PC compatible and a copy of the BASICA language, you can bring *Question* along for fun wherever you go.–CW

Alpha Software Corp.
30 B St.
Burlington, MA 01803
800/451-1018, 800/462-2016
Massachusetts, 617/229-2924
List price: $45
Requirements: 64K, one disk drive

Sigma Designs' Trail Guide To High Performance.

The trail to high performance starts with a company which builds added-value and rugged reliability into everything they make: SIGMA DESIGNS' boards are multilayered for superior noise protection, their software is developed for *full* compatibility and thoroughly debugged, interfacing is consciously made easy, and all products are subject to rigorous burn-in and quality control testing.

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Start your climb to the top with our full line of boards to provide added functionality to your PC: 1) RAM only *SDI-384*, which fits into the short PC XT or the PC portable slots; 2) the *SDI-SSC*, which offers a parallel and serial port plus clock, game adapter, *Spool* (a print buffer) and *Softdisk*, a virtual disk in RAM; 3) the *MAXIMIZER*, which provides both RAM and multifunction in one powerful multilayered board; and 4) our *Floppy Controller II* which supports both standard and high density (1.2, 2.6 MB) drives.

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Utility software allows you to back up a 10 MB disk in 3 minutes in image mode. Other features include: file-by-file, menus, recursive directory, directory creation, multi-tape, and indirect file list.

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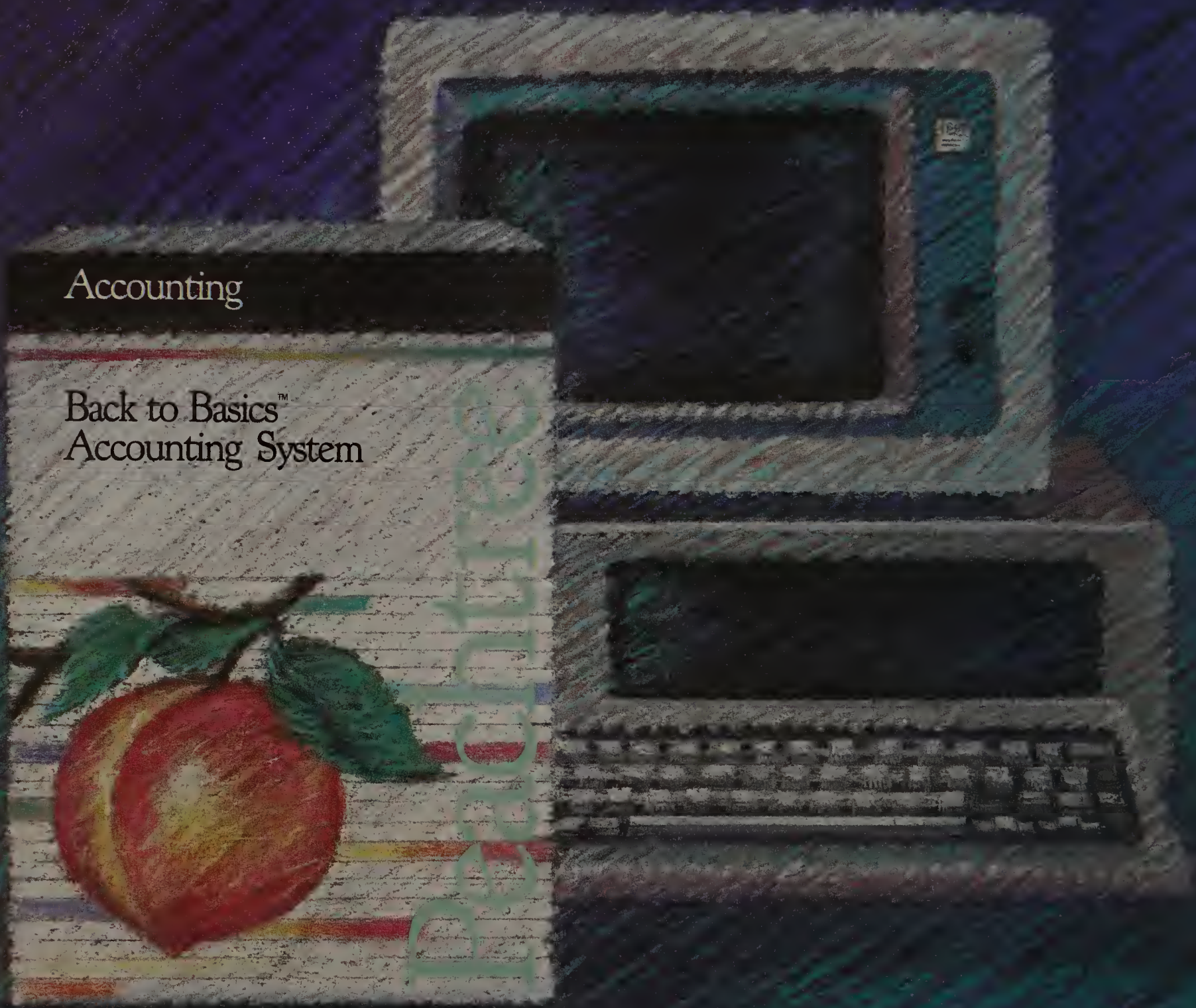

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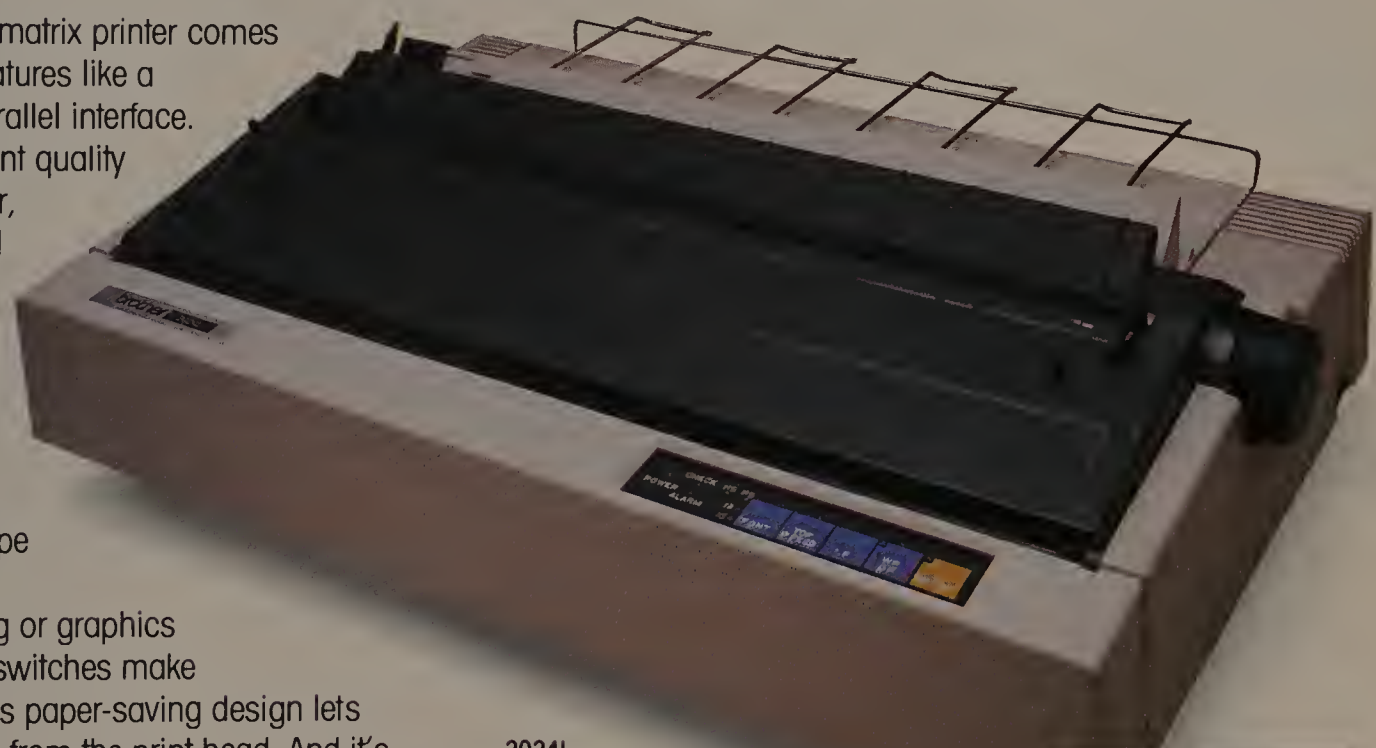
The One-Price Printers.

One low price includes everything... but the paper.

The Brother 2024L dot matrix printer comes standard with advanced features like a bidirectional tractor and parallel interface. And it produces the best print quality you'll find in a matrix printer, using its 24-wire print head to place dots in a dense high resolution pattern.

Switch from word processing to draft speed at the press of a button. The 2024L uses the two most common sets of escape codes to match your word processing, data processing or graphics software. Other front panel switches make operation easy. The 2024L's paper-saving design lets you tear off sheets one inch from the print head. And it's compact, reliable, and quiet. For long life and active use.



2024L
(under $1500)

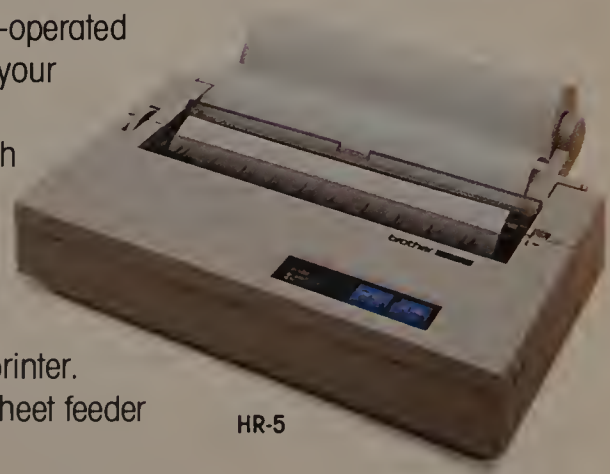
For portable printing, the M-1009 is the smallest dot matrix printer in the world today. But don't let its size fool you. Big features like a bidirectional logic seeking 9-pin print head, front panel controls, and parallel interface are standard with the M-1009. It even comes with a tractor feeder and acoustic cover.

M1009
(under $250)

SF-50
(optional Sheet Feeder)

The briefcase Brother HR-5 is a battery-operated thermal printer small enough to fit next to your computer in a standard-sized briefcase. Switch from thermal paper to smooth-finish plain paper using a cartridge ribbon. And the parallel interface is included in its low price.

In fact, our only option is the automatic sheet feeder you can add to your 2024L printer. Choose letter size or an adjustable large-sheet feeder for smooth, unattended operation.



HR-5

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Circle 896 on reader service card

Traditionally, databases have been left-brained.

Don't get us wrong. DayFlo is as left-brained as any database around. It can handle structured information such as customer lists and personnel records. Keywords and field names are used to gain access to records.

Just like traditional databases.

However, solving traditional problems in traditional ways is just one side of DayFlo. It's also flexible enough to handle today's new challenges in exciting new ways.

And that's where strictly left-brained databases get left behind.

The First Free-Form Database.

In the real world, there's always an exception to the rule.

Which wreaks havoc on traditional databases. For example, because of fixed formats, entering a new field such as a Telex number into a single customer record is next to impossible. Unless you're prepared to reprogram and reformat your entire database.

DayFlo, on the other hand, eliminates these tedious operations.

Word-Oriented Database.

Unlike traditional databases, DayFlo has integral word processing. For instance, you can store letters and memos along with customer lists in the same database.

Now you're free to manipulate data at will. Free to enter, retrieve, edit and shuffle information whenever and wherever you please.

Every fact you need, from key client lists to spontaneously entered notes and ideas, is just a few keystrokes away.

Power, Yes. Programming, No.

DayFlo is a powerful package that runs on an IBM PC with hard disk, Compaq Plus, or compatibles.

Yet, you don't have to be a programmer to use it.

So you see, DayFlo is a much greater information management tool than any traditional database. Much more flexibility and power than pfs. Much easier to use than dBASE II.

ReportFlo.

With our ReportFlo package, you can produce presentation-quality documents, reports, letters, memos and so forth from the data stored in DayFlo. This potent report writer also performs calculations.

COMPARING DAYFLO TO TRADITIONAL DATABASES

TRADITIONAL DBMS	THE BENEFITS OF DAYFLO
• Fixed record format. All records must look alike.	• Free-Form record format. No two records need look alike. All record formats are stored in same database.
• No word processing capabilities.	• Integral word processing. Create and store letters, memos, notes, ideas, etc.
• Fixed field length.	• Variable field length. No counting character spaces.
• Adding new fields requires remapping or reformatting of database.	• Instantly add new fields to existing records without reformatting the entire database.
• One value per field.	• Multiple values per field. Information where you want it.
• Retrieves data based on pre-planned criteria only.	• Retrieves information based on content or key words.

WHAT YOU CAN DO WITH DAYFLO

- Client Record Tracking
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- Purchase Order Tracking
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- Field Service Tracking
- And much more

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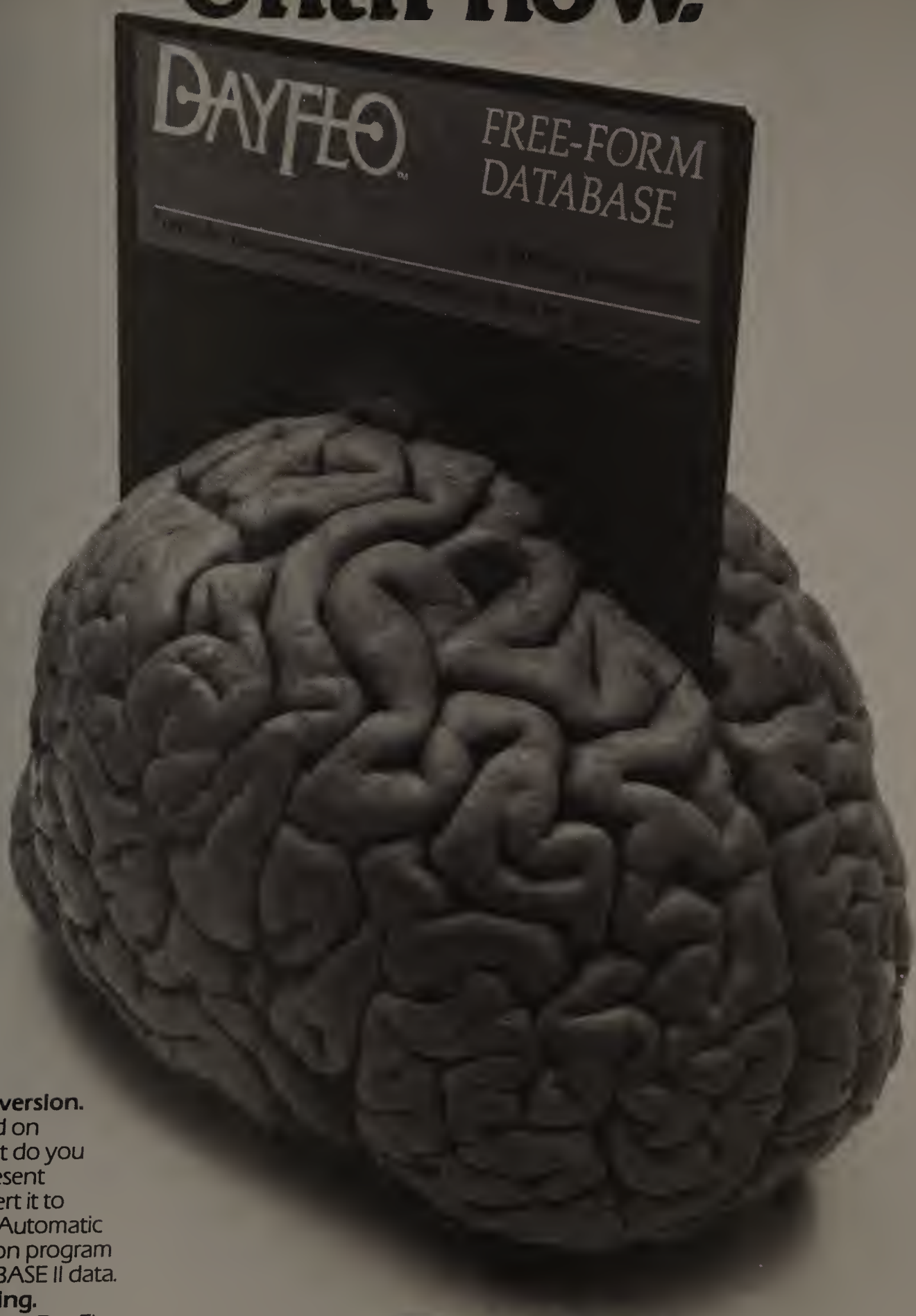

Automatic Conversion.
OK, you're sold on DayFlo. But what do you do with your present database? Convert it to DayFlo. Use our Automatic Record Conversion program for your pfs or dBASE II data.

Seeing Is Believing.
Visit your nearest DayFlo Dealer and see DayFlo in action for yourself. Or, if you prefer, we'll send you a Demo Disk for $10. For details, call 1-800-7DAYFLO. In California, call 1-800-CDAYFLO.

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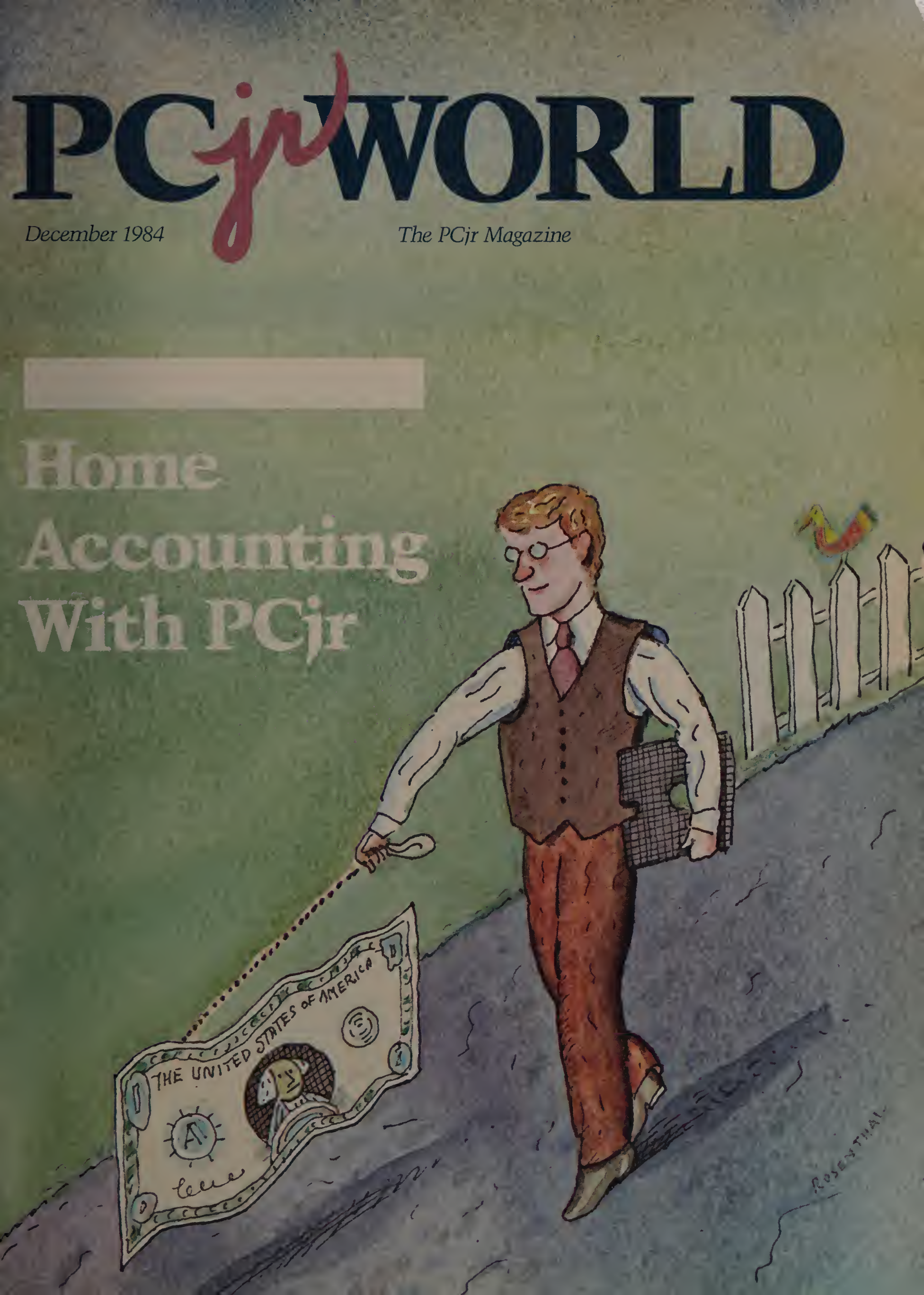
Circle 867 on reader service card

PCjr WORLD

December 1984

The PCjr Magazine

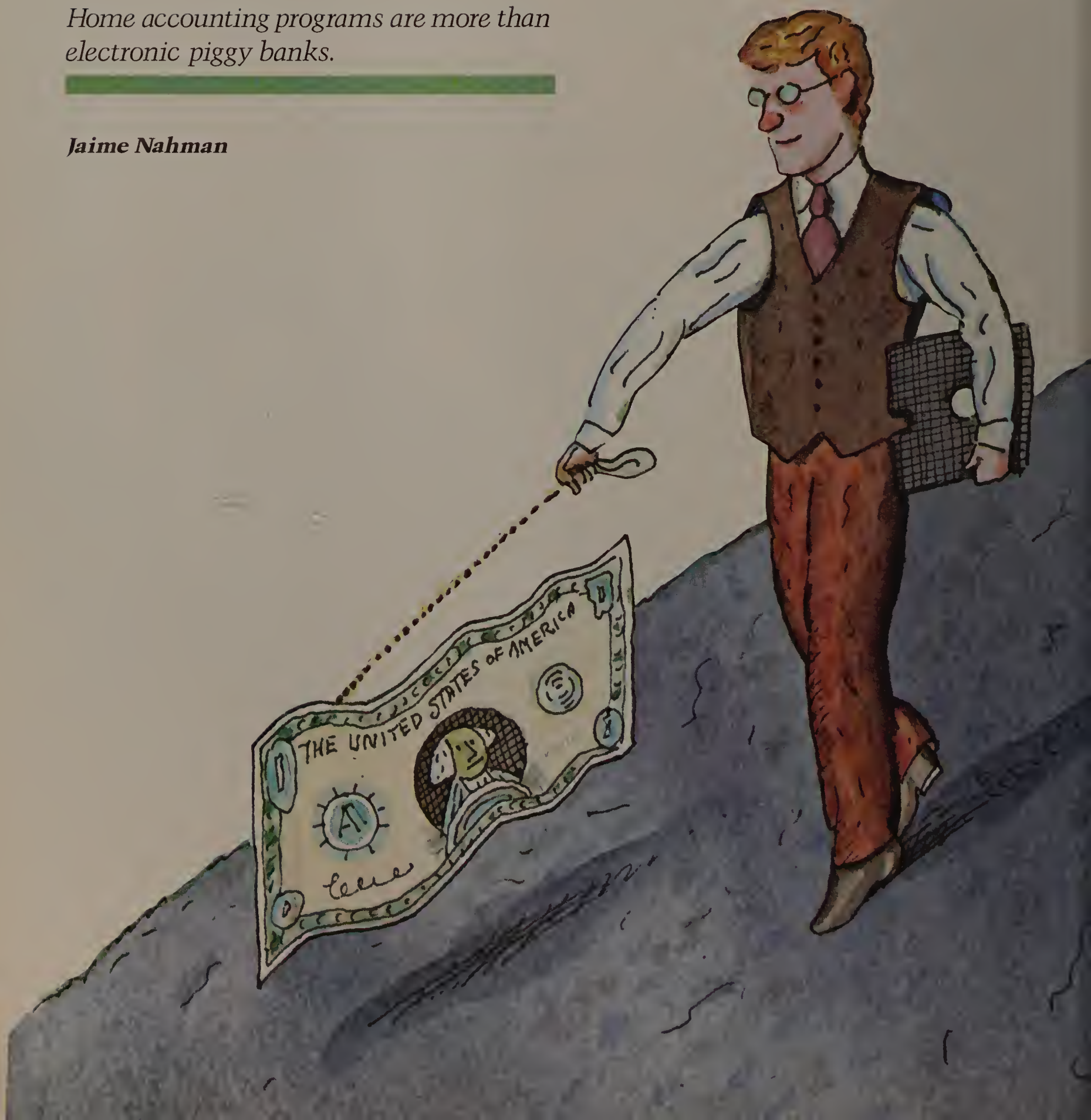
Home Accounting With PCjr



Holding Yourself Accountable

Home accounting programs are more than electronic piggy banks.

Jaime Nahman



Are you considering spending your hard-earned dollars on a home accounting program? In addition to keeping track of your home finances, these programs usually promise to give you insight into your monetary situation and help you to manage your money more effectively.

Home Accountant Plus, Home Accountant jr., and *Dollars and $ense* are among the best-selling home accounting programs. These programs help you set up and monitor your books in much the same way that a bookkeeper keeps track of a small business's general ledger. A business usually requires inventory control and cost management. Your income and expenditures, while not usually as large as a business's accounts receivable and accounts payable, need just as much organization.

What to Look For

When you evaluate a home accounting program, you should examine its capacities and limitations—the number of main accounts, such as assets, liabilities, income, and expenses, that the program allows and the number of distribution accounts, such as mortgage, food, and clothing, that each main account can handle. You should also check to see whether or not the program places a limit on the number of transactions per month or per year.

The ability to flag transactions for tax purposes is also necessary. This feature can, of course, save you from a mad scramble for receipts come tax time, but you can use these flagged records as financial planning tools long before April 15. You can, for example, examine these records on a monthly basis to keep a running total of your tax write-offs or liabilities.

It is imperative that a home accounting program include a split transaction feature so that expenses are distributed to proper budget and tax categories. For example, a monthly check to a mortgage company represents a triple transaction. First, the full amount of the check, which is applied to a principal, is debited against a liability account, the mortgage. At the same time it is credited toward an asset account, the house account, since with each payment you own more of your house. A third part of the check, the portion paying the interest on the loan, is a tax-deductible expense and must be so recorded.

An essential feature of a home financial program is an automatic transaction function that allows you to predefine repetitive transactions. Regular transactions such as mortgage, insurance, and car payments are standard parts of a bill-paying routine. Deposits, such as semimonthly paychecks or trust fund payments, are often the same amount each time. A good financial program permits you to save such transaction information on disk, enabling you to recall the information automatically when it is needed.

Home accounting programs can often print checks for you, but you normally have to order special checks to make use of this feature. In addition, some programs produce reports and statements, such as budget and forecasting reports and net worth statements. Some home accounting programs can also display or print reports and forecasting information in graph form.

Two Popular Programs

Home Accountant Plus, which runs on the IBM PC, and *Home Accountant jr.*, which runs on the PCjr, are from Continental Software. Since the two programs are almost identical, they will be referred to as the *Home Accountant* programs throughout the review. Differences between the two versions will be specified. *Dollars and $ense*, from Monogram (a division of Tronix Publishing), can run on either the IBM PC or the PCjr. The *Home Accountant* programs run under DOS and permit you to make backup copies. *Dollars and $ense*, which runs under the UCSD p-System, is copy-protected, but the package includes a backup program disk.

A major difference between the *Home Accountant* programs and *Dollars and $ense* is their screen designs. Both versions of *Home Accountant* are designed for a 40-column display. Although this design is workable, most people prefer an 80-column display. *Dollars and $ense* offers the choice of a 40- or 80-column display.

The Home Accountant *programs let you view only one transaction at a time;* Dollars and $ense *displays a screenful of transactions.*

All the programs are menu-driven. *Home Accountant Plus* maintains 200 main accounts, or, as the program calls them, budget categories. A total of five checkbooks are tracked. *Home Accountant jr.* maintains 100 main accounts and five checkbooks. Neither version places a limit on the number of distribution accounts or annual transactions for the fiscal or calendar year, but *Home Accountant Plus* handles only 2000 transactions per data disk, and *Home Accountant jr.* handles 1000. *Dollars and $ense* permits a total of 120 main accounts, of which 12 may be defined as checking accounts. The number of distribution accounts is limited only by disk size. *Dollars and $ense* can work with up to 2000 transactions on a single-sided disk and up to 4000 on a double-sided disk.

The programs differ in how they display transactions during data entry. The *Home Accountant* programs let you view only one transaction at a time; *Dollars and $ense* displays a screenful of transactions. Since the *Home Accountant* programs don't offer scrolling or page-back commands, you have to exit and then reenter the data entry function in order to change a prior transaction. *Dollars and $ense* allows you to change any transaction by scrolling forward or backward through the transaction listings during data entry.

Automatic and Split Transactions

Both programs flag transactions for tax purposes and allow unlimited split transactions. Both programs have provisions for automatic transactions, but this feature reveals the major differences between the two programs. The *Home Accountant* programs permit only 5 automatic transactions per month per checkbook, for a total of 25. In contrast, *Dollars and $ense* permits 100 automatic transactions grouped into 25 sets, for a total of 2500.

You can't skip over automatic transactions. When you set up your accounts, you have to plan which automatic checks need to be paid weekly, monthly, and quarterly. You wouldn't, for example, want to put a monthly transaction with weekly payments, because you can't pass over this transaction for three weeks. Since *Dollars and $ense* offers more automatic transactions, it has a slight advantage over the *Home Accountant* programs.

The two most powerful tools in a home accounting program, the automatic and split transaction features, should work together. It doesn't make sense to make your mortgage payment an automatic transaction if you can't credit your expense and asset accounts when the payment is made. The *Home Accountant* programs cannot split automatic transactions. *Dollars and $ense* permits you to split as many automatic transactions as you want.

Check Writing

Both programs print checks, and both include information on where to order special checks. *Dollars and $ense* will print the checks with the payees' addresses; however, the program does not allow you to save address information on disk. You have to type this information each time or add addresses manually to printed checks. The *Home Accountant* programs allow you to create a payee register with up to 50 names and addresses. This information can be saved on disk and recalled whenever it is needed.

Reports	Home Accountant	Dollars and $ense
Budget amounts for all accounts	Yes	Yes
Actual amounts for all accounts	Yes	Yes
Budget vs. actual for all accounts	Yes	Yes
Net worth	Yes	Yes
Net income	Yes	Yes
Account balances	Yes	Yes
Account balances vs. budget	Yes	Yes
Income-expense summary	Yes	Yes
Reports to screen	No	Yes
Reports to printer	Yes	Yes
Graphs		
Actual vs. budget	Yes	Yes
Monthly actual vs. budget	Yes	Yes
Monthly net income	No	Yes
Monthly net worth	No	Yes
Composite accounts	No	Yes
Trend lines	Yes	Yes
Graphs to screen	Yes	Yes
Graphs to printer	Yes	Yes

Table 1: Report and graph capabilities.

	Home Accountant Plus	Home Accountant jr.	Dollars and $ense
Number of main accounts	200	100	120
Number of checkbooks	5	5	12
Number of automatic transactions	25	25	2500

Comparison of the programs' size limitations

Reports, Graphs, and Forecasting Features
The *Home Accountant* programs and *Dollars and $ense* make good use of reports and graphic representations of data, as Table 1 shows.

Dollars and $ense includes a forecasting module that estimates federal taxes based on your financial data. You can create up to five alternative tax situation models and examine them on the screen simultaneously. However, the documentation cautions you not to use the forecasting module to prepare your actual tax returns. *Home Accountant Plus*'s forecasting module helps you compute the future value of an investment and chart various budget models and saving plans. *Home Accountant jr.* has no forecasting module.

The Bottom Line
I prefer *Dollars and $ense* to the *Home Accountant* programs because it allows you to split automatic transactions and view more transactions during data entry, but both programs do a good job of helping you assess and track your financial status. Both the *Home Accountant* programs and *Dollars and $ense* require a commitment of time to set up accounts and then to keep the computer ledger up-to-date. But if a home financial program gives you a better understanding of your economic situation, it will be time well spent.

Jaime Nahman is a registered psychological assistant who is completing his Ph.D.

Home Accountant Plus and Home Accountant jr.
Continental Software
11223 S. Hindry Ave.
Los Angeles, CA 90045
213/417-8031, 213/410-3977
List price: Home Accountant Plus $149.95, Home Accountant jr. $74.95
PC requirements for Home Accountant Plus: 128K, one disk drive (two recommended), DOS 2.00 (color graphics board required for graphics)
PCjr requirements for Home Accountant jr.: 128K, one disk drive, DOS 2.10

Dollars and $ense
Monogram, a division of Tronix Publishing, Inc.
8295 S. La Cienega Blvd.
Inglewood, CA 90301
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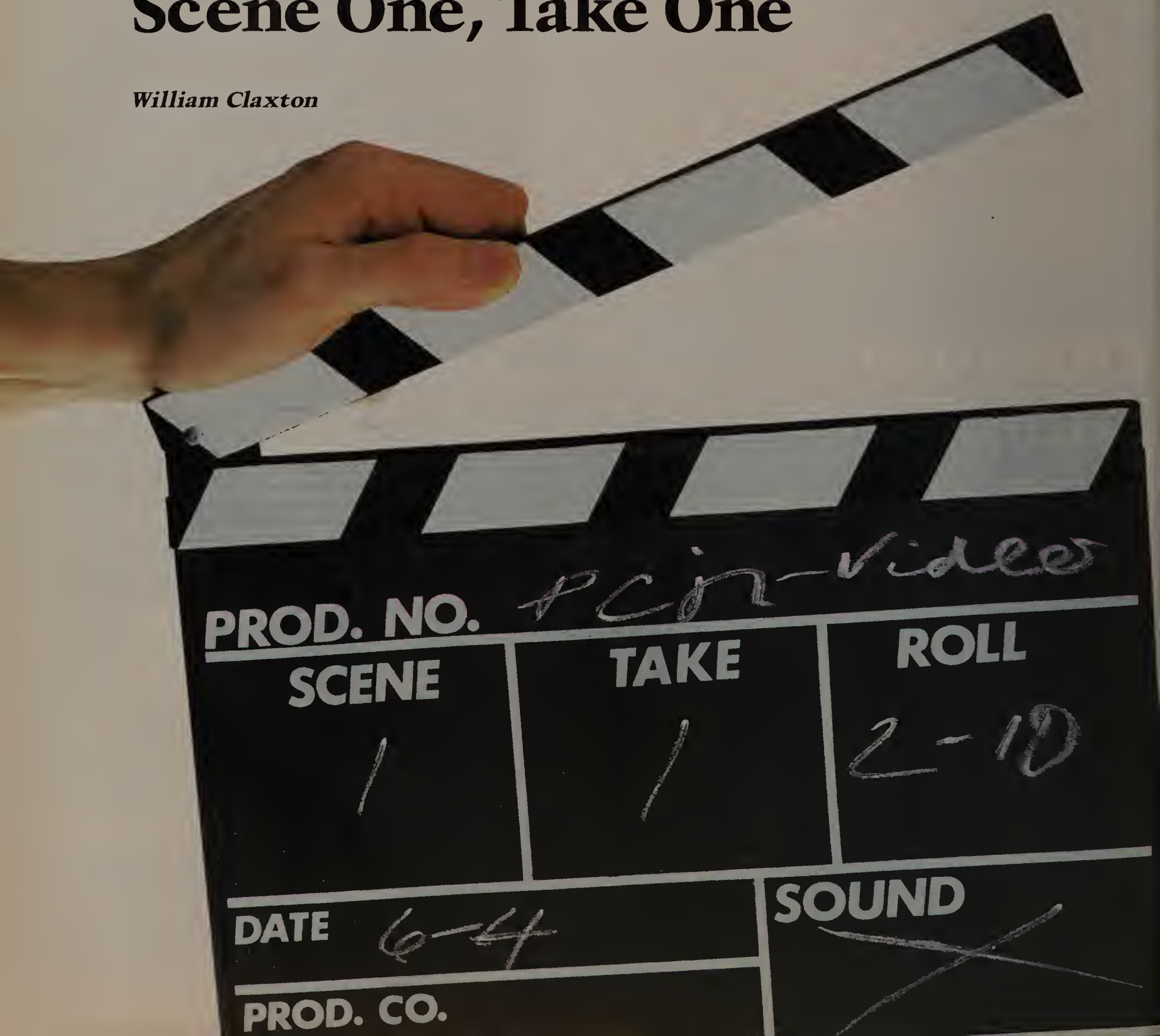
An inside look at the first videotape logging system for the PC and the PCjr

Scene One, Take One

William Claxton



Imagine that your company assigns you to design a sales presentation that will be used in field offices across the country. You want to provide clients with detailed information, but you also want a presentation with visual impact. Since many of your offices are equipped with video tape recorders and computers, you decide to create a presentation that incorporates both machines.

Suppose, for example, that you're a Realtor and your company has produced a 10-minute videotape of prime commercial properties in downtown Houston. As video segments showing each lot or building play on the video tape recorder (VTR), you want the computer to display a full-page description of each property. And you want clients to receive a printout of each property description they are interested in.

A dual presentation of video and computer text is possible with the purchase of a special expansion board for the PC or the PCjr, called a "timecode reader," and a program written in BASIC. Timecode readers are common in video production, but none have been marketed for microcomputers until recently. Michael Short Consulting of Burbank, California, produces timecode reader boards for both the PC and the PCjr. A prototype of their board was used in preparation for this article.

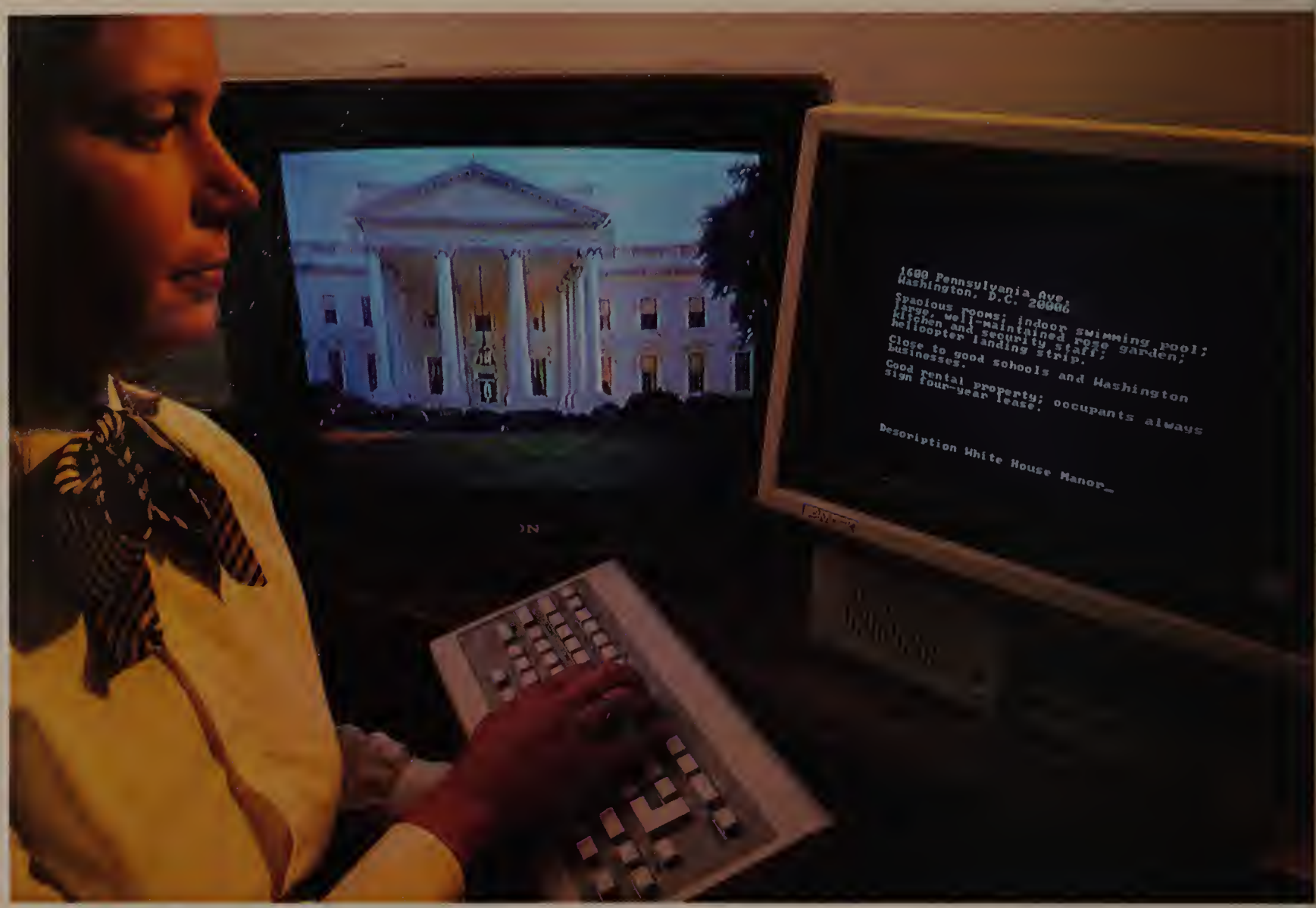
Videotape Logging

Assembling your presentation requires some knowledge of video production techniques. To begin with, you must know how to locate each property on the videotape. The smallest unit of information a VTR can locate is an individual frame. In professional studio productions, videotape is encoded with a reference signal known as "timecode." This signal is read as hours, minutes, seconds, and, most importantly, frames. With timecode, every scene is identified by how far it is from the beginning of the tape, measured in amount of time and number of frames. So your first task is to put timecode on the Houston properties videotape. Production studios (listed in the Yellow Pages under "television program producers") offer timecoding services for $35 to $50 per hour of tape.

Timecode is usually placed on a videotape's second, unused audio track so it cannot be seen or heard by viewers; however, studios often put a copy of the timecode in the picture for visual reference during production work. This enables a video producer to view the tape and create a "tape log," a written record of what happens at given points on a tape. A timecode reader board enables the computer to read and display the timecode from the videotape so you can create your own tape log. While most producers do videotape logging with pencil and paper, you can create a PC- or PCjr-generated log.

Equipment Layout

To make a log of the real estate videotape, you would first link the computer and its monitor to the VTR and the VTR monitor. You need an enhanced version of the PCjr, with a disk drive, 128K of memory, and an 80-column display; a PC requires one disk drive and 128K of memory. The VTR can be any brand of home machine, provided it has stereo audio; since timecode is laid on one audio



A house hunter looks at rental property in Washington, D.C.

DATE:	04/10/84	REEL:	104
TIME:	14:33		
LOGGER:	WMC		

00:01:04:23	Introductory segment. Narrator describes Houston and tells why many corporations are moving to that city. He says we will see photos of some Houston properties.
00:02:32:15	First property, view from Main Street.
00:02:45:06	Second property, downtown highrise.
00:02:55:22	Another angle of the same building. A restaurant and garden court are on the ground level.

Figure 1: Sample video log

track, the VTR must be able to play the narration and music on the second audio track. The two machines should be adjacent to each other so that you can view both monitors simultaneously.

The timecode reader board fits in a PC expansion slot or attaches to the PCjr's I/O expansion bus. A single cable connects the computer to the VTR. The computer end of the cable plugs into the timecode reader board, and the other end of the cable plugs into the audio output of the VTR. I have written a program called Video Basics that is designed specifically for use with Michael Short's timecode reader board and is sold with that board. Inevitably, other hardware and software designers will produce similar video/computer packages. By taking a close look at how this program works, you can get an idea of how powerful the combination of video and computer can be.

Creating a Log

A video log is a written record of video elements and their locations on a tape. Traditionally a log has two columns; one column contains the timecode, and the second column contains a short description of the action or the scene that is displayed on the videotape at that moment. Responding to a keyboard command, Video Basics retrieves the current timecode and places it on the left side of the computer's screen. You would then complete the rest of the "log entry" by typing a short comment, such as "view of ground-level courtyard and restaurant."

If you want to create a log for the real estate videotape, your first step would be to make sure that the VTR and the computer are properly connected. You would then insert the videotape into the VTR and press the Play button on the VTR's console.

While the videotape introduction begins, you would load Video Basics into the computer. The Video Basics main menu has seven selections: Newlog, Textlock, Pagelock, Index, Load, Save, and Quit. You would choose the Newlog option.

Each log must be given a name that is no longer than 8 characters and does not include a suffix. In this case, for example, you could name the file CITYLOTS. The program accepts the file name and, after prompting you for your initials, transforms the computer screen. In the lower left of the PC or PCjr screen is a small window with what looks like an odometer; this is the videotape timecode. As the real estate program plays on the video monitor, the timecode spins along on the computer monitor. When you press the Pause or Stop button on the VTR, the timecode on the PC or PCjr stops; when you press Play, the odometer moves again.

Establishing the Timecode Link

Once you understand what is displayed on the two monitors, you would rewind the tape and play it again from the beginning. When the narrator comes into view on the VTR screen, you would press a function key. This command retrieves the current timecode and places it in the upper left part of the computer screen. Next to the timecode is a comment entry line, an inverse video line where you type the scene description. For the first comment, you would type Introductory segment. Narrator describes Houston and tells why many corporations are moving to the city. He says we will see photos of some Houston properties. When a picture of the first property appears on the video monitor, you would type First property, view from Main Street.

Video Basics retrieves the current timecode and places it on the left side of the computer's screen.

Although you will probably want to keep comments short, comments may be any length; entries longer than 65 characters are formatted line by line on the screen (see Figure 1).

Successive entries become natural. Most of the time, your eyes are fixed on the videotape program. If your typing speed is at least 45 words per minute, you can probably keep pace with the tape. If you cannot, however, you can pause or rewind the tape at any time with the VTR controls because the timecode is always synchronized with the videotape.

When you reach the end of the video program, you would exit the logging section, return to the main menu, and save the entire file to disk. Video Basics automatically adds the suffix *.LOG* to the names of files as they are saved to disk.

Textlock Option

To view the log, you would select the Textlock option from the main menu and specify the CITYLOTS file. The log appears, but the first log entry is located in the center, rather than at the top, of the computer screen. If you look at the numbers in the left column, you see that they are in chronological order. At the bottom of the screen is the familiar, but now static, timecode, along with a prompt, 'Please PLAY video program for Textlock'. Then you would rewind and play the videotape. As the VTR replays each video segment, Video Basics moves the associated comment up to the center of the PC's or PCjr's screen as part of a continuous scrolling log.

As each property appears on the video monitor, the page of description retrieved from the text file appears on the PCjr monitor.

If your VTR allows you to search for a particular screen in the Play mode, you can move the tape forward and backward, and the program's Textlock option scrolls the text in synchronization with the videotape. Video Basics does this by comparing the current timecode with numbers in the log and placing the entry with a timecode closest to the current timecode in the center of the screen.

Linking Other Files

Once you have a complete log of the real estate tape, you can create a detailed page of description for each property with a word processing program such as *HomeWord*. You would create a text file in standard ASCII format with the same name as your log, but with the suffix *.TXT*, indicating that it is a text file. Video Basics' Index option links CITYLOTS.LOG with the CITYLOTS.TXT file.

Next you would select the program's Pagelock option and play the videotape from the beginning. As each property appears on the video monitor, the page of description retrieved from the text file appears on the PC or PCjr monitor. For each property, the computer screen is cleared, and a new page of text is displayed. You can make the videotape pause, so that clients can read the property descriptions as they view the tape, or you can print out the text file for them after the video presentation.

File Maintenance

Since real estate prices change, you must update files from time to time. By editing the text with a word processing program and reindexing, the property descriptions can be updated as often as needed. There is no need to modify either the videotape or the log. Your final task would be to distribute copies of the video program, along with copies of your most recent disk update of the .LOG and .TXT files, to each suitably equipped real estate office.

Other Applications

Travel agencies are other businesses that might link computers to video recorders. Many travelers would prefer to make a vacation decision after seeing several alternative sites on video and reading relevant details such as hotel availability, local transportation services, and theater and event schedules.

Ten million homes in the United States have video tape recorders, and that number is expected to quadruple by the end of this decade. So there is every reason to see the VTR and the computer as effective partners.

William Claxton is an independent video editor and producer who develops interfacing software for the PC and the PCjr and video editing systems.

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If you are interested in writing your own timecode program for Michael Short's timecode reader board, you can send for a copy of a template. The template captures and displays data as timecode on the PC or PCjr screen and adds and saves short text comments in a temporary index file. Please send a self-addressed, stamped envelope to William Claxton, c/o Editorial Department, PC World, *555 De Haro St., San Francisco, CA 94107.*

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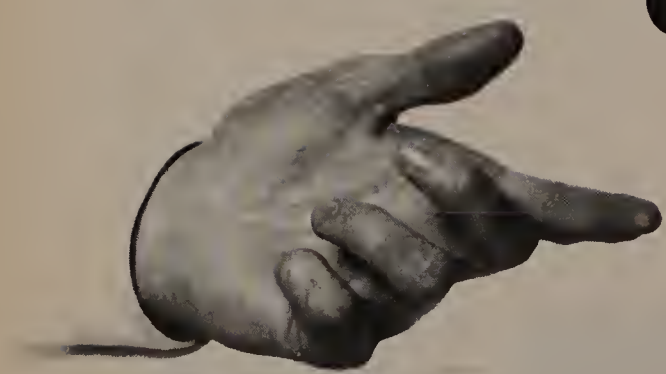
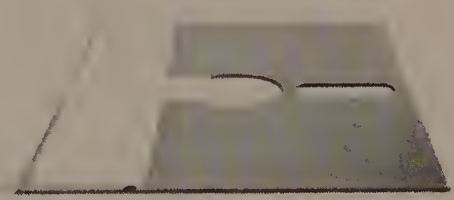
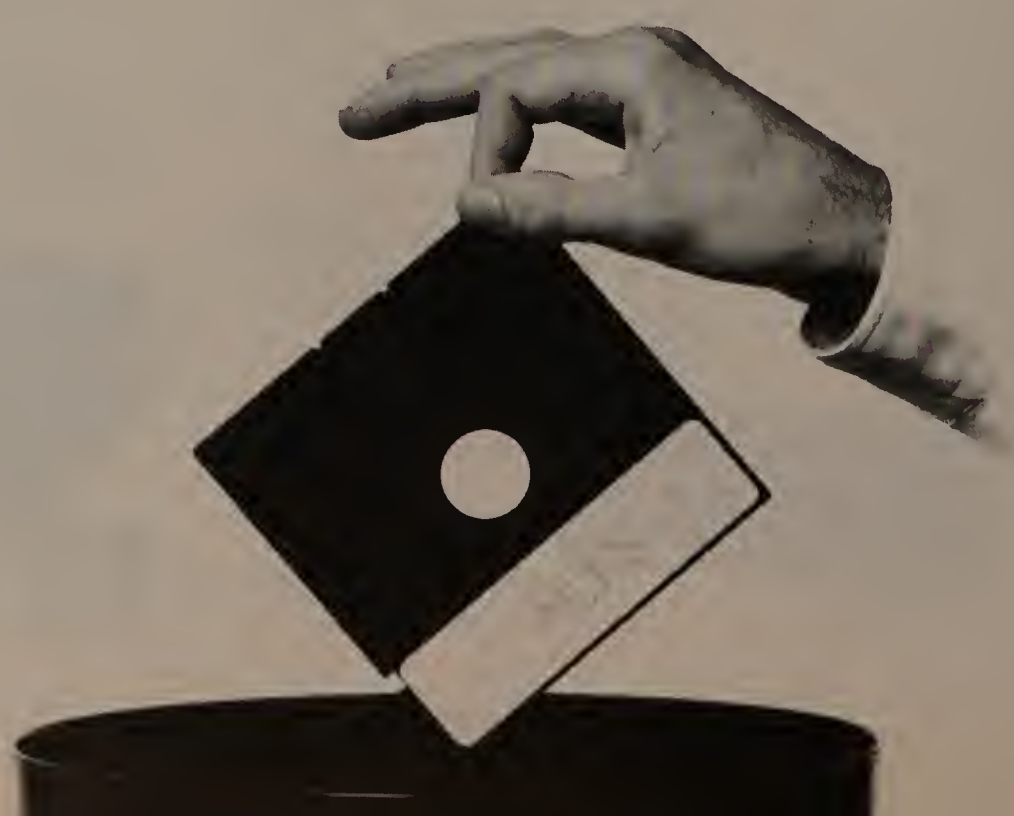




& downright boring.



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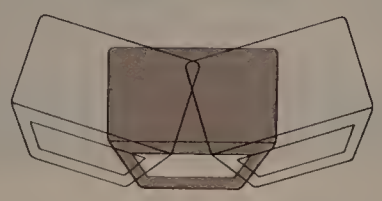

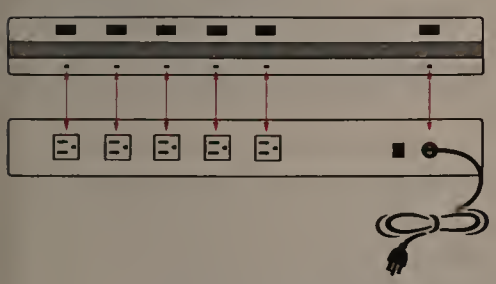

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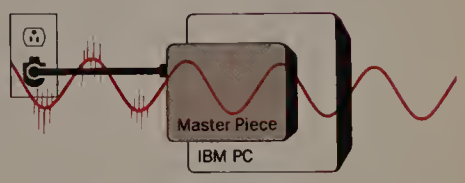

Surges, spikes and line noise are responsible for 70–90% of PC malfunctions. They can wipe out memory in your PC, taking hours of hard work with them. That just costs you time. Even worse, they can zap your delicate chips, sending your PC in for repairs. That costs you money.

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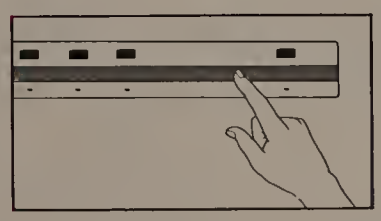

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Circle 474 on reader service card

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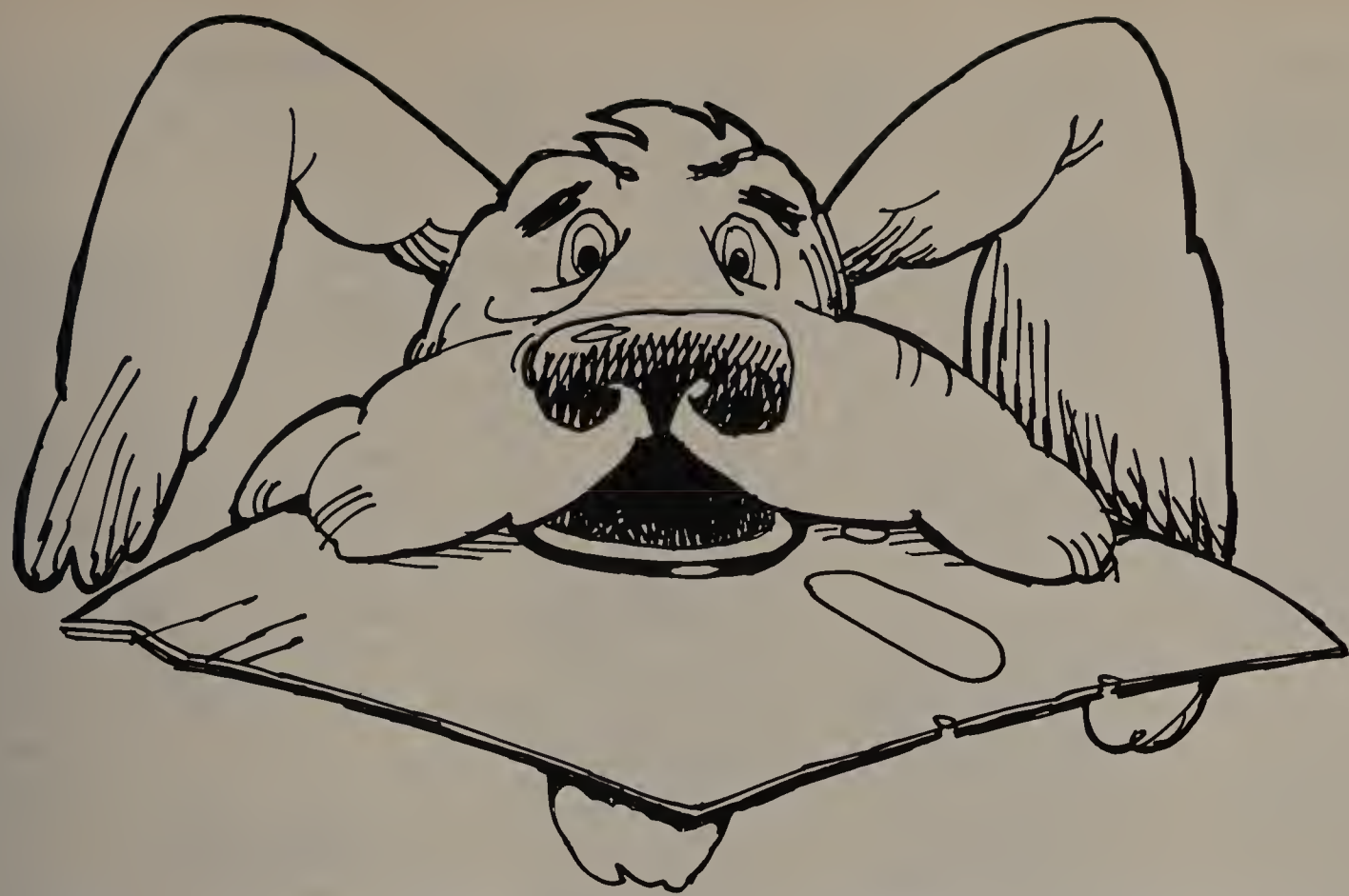

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DR Graph ..... Call
Personal Basic 86 ..... Coll
PL/1-86 ..... Call
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Please ..... Call

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Softsell
Templates, diskettes Coll

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w/ Par Port..... 219
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Circle 681 on reader service card

AT: The PC's Powerful Partner

The PC AT, IBM's new top-of-the-line personal computer, is being marketed as a potent single-user or multiuser system and as the fulcrum of the firm's new local area network. At first blush, the AT appears to be as malleable—and as subject to third-party sculpting—as the PC itself.

Ken Greenberg and Karl Koessel

With unusual candor, IBM president John Akers told *Computerworld* last spring that the company was planning to exploit a host of new technologies and fill new market niches. Akers vowed that in the ensuing five years, IBM would emphasize "personal computers and work stations; communications products; software of all kinds, both system software and application software; and storage products from high to low, both hard and floppy disks."

Last August 14 IBM rolled out the Personal Computer AT (Advanced Technology) and began to make good on John Akers' pledge. In adding the AT and an array of related products to its lineup, IBM has covered a number of bases with a single price-competitive swat. With the AT, IBM is offering enhanced system support (via three new operating systems), filling the gap between the PC XT and the 3270-PC, and tying together a broad spectrum of IBM computer products with a local area network (LAN).

At the same time, IBM is spurring development of multiuser and multitasking applications by pegging them to a machine that features unrivaled speed, storage, and system expandability.

The PC AT is perhaps the most formidable stand-alone personal computer on the market, consolidating existing and forward-looking technologies—and inching into the realm of the so-called supermicro. It's the first personal computer from a major manufacturer to be built around Intel's 16-bit, multitasking, multiuser 80286 microprocessor—although the 80286 remains a chip in search of worthy software (see "80286: Intel's Multitask Master," *PCW*, Vol. 2, No. 12).

Once again IBM has produced a machine that maintains basic compatibility with the rest of the PC line, even though a number of components cannot be used interchangeably with the PC. Big Blue is publicly proclaiming that the AT is an "open architecture" box toward which third-party enhancements can gravitate. As it did with every member of the PC family, IBM has released the AT's Technical Reference manual. And although it's barely out of the starting

The PC AT, IBM's formidable new entrant in the PC marketplace, functions equally well as a stand-alone PC, a multiuser/multitasking machine, and a network file server.

PC WORLD
IBM

Table 1: Dueling processors[1]

Task	Time (in minutes and seconds)[2]		
	IBM PC XT (8088)	Compaq Deskpro (8086)	IBM PC AT (80286)
Reformat this article using *WordStar*	1:51	1:32	:59
Load a 267K *1-2-3* worksheet	1:28	:50	:36
Save a 267K *1-2-3* worksheet	:42	:45	:21
Recalculate a 267K *1-2-3* worksheet	:14	:08	:05
Sort a 150K 399-record *dBASE II* file	4:07	3:41	2:17
Find all prime numbers less than 1000[3]			
in Interpreted BASIC	8:56	4:10	3:33
in Compiled BASIC	:11	:06	:06
Run GLOBE, a graphics-intensive BASIC program[4]			
in Interpreted BASIC	4:56	2:18	1:50
in Compiled BASIC	:45	:22	:15

[1] The computers included in this test were selected because each features a different Intel microprocessor. The XT's 8088, the Deskpro's 8086, and the AT's 80286 are all part of the same microprocessor family.

[2] The timing results shown here reflect a test of specific data files and do not represent other files that are the same size. Timings are affected by variations in the way data is structured.

[3] The program used here is taken from PRIMES.BAS, BASIC version, in "Four FORTHs," *PCW*, Vol. 2, No. 5.

[4] The program used here is taken from "A World for Your PC," *PCW*, Vol. 1, No. 1.

gate, the AT is already the impetus for a new generation of expansion boards, disk media, windowing software, and networking products.

Sharing equal billing with the AT's stand-alone capabilities is its powerful penchant for communications. Given the appropriate operating system, the AT will collaborate with other PCs in either a multiuser (shared processor) or networked (shared data and peripherals) setting. The AT is the centerpiece of IBM's new PC Network—an offering that fits into the company's larger scheme to link all of its computer products (see "Local Area Networks," *PCW*, Vol. 2, No. 7).

Features to Mix and Match

The PC AT comes in two basic models, both of which can easily be customized. Model 68, priced at $3995, has 256K of installed RAM and a single half-height 5¼-inch floppy disk drive with 1.2MB of storage, four times the amount of the PC's 360K floppy drive. Model 99 lists for $5795 and features 512K of installed RAM, the 1.2MB floppy disk drive, a combination serial and parallel board, and a full-height 20MB hard disk. (By comparison, $4395 buys a PC XT with 256K of RAM, a 360K floppy disk drive, a serial board, and a 10MB hard disk.)

Both AT models are built around the Intel 6-MHz 16-bit 80286 microprocessor and IBM's new 16-bit input/output bus, performing at a rate two to three times faster than the PC. While the added speed won't make you a more accomplished typist or quicken the pulse of your printer, it will hasten copying files, recalculating worksheets, and sorting data base records (see Table 1). Common to the two versions of the AT are 64K of ROM (including an enhanced BASIC interpreter), the capacity for up to 3MB of user memory, a real-time clock/calendar with battery backup, a socket for the 80287 math coprocessor, a combination floppy disk and hard disk controller board, eight expansion slots, and a 192-watt power supply (including a fan whose speed varies with the temperature, reducing noise).

The AT boasts a revamped 84-key keyboard with modifications that are apt to please critics of the PC's keyboard. The AT's keyboard, however, cannot be used with the PC or any other product in IBM's PC family (see "In a New Key"). One other accoutrement of note is Keylock, a security lock on the front of the system unit designed to control access in network settings. Locking the AT prevents rebooting,

shuts down the keyboard, and prohibits removal of the system unit cover. Keylock is also available for the PC, the XT, and the XT/370.

IBM's confidence in its latest entry extends to service: the company is including a one-year warranty with the product.

The new IBM machine does not include a video board or a monitor. The PC's monochrome and color graphics boards work on the AT, but quite a bit of the existing PC hardware doesn't (see "A Wardrobe Change"). Among the options for the AT are a half-height 5¼-inch 320/360K floppy disk drive, a second internal 20MB hard disk, a Floor Standing Enclosure, and a tilt-and-swivel monitor stand (suitable for IBM's entire PC line). Although it's a slightly different kind of option, DOS 3.00 is the AT's new single-user, single-tasking operating system; it is priced at $65 (see "3.00 and Counting").

Media is the Message

The AT is most modular in the area of disk storage. The new machine is equipped with compartments for three disk drives—either two half-height floppy drives and a full-height 20MB hard disk, or a single half-height floppy drive and two full-height 20MB hard disks. The second hard disk is tucked beneath the 1.2MB floppy drive in the AT's right-hand compartment. Incidentally, a 1.2MB floppy lists for only $225 more than the new half-height 320/360K drive.

In addition to mixed and matched disk drives, the AT offers a choice of floppy disk drive capacities. DOS 3.00, the AT's primary operating system, reads and writes in the traditional 320/360K floppy format, but IBM is selling the AT's 320/360K unit only as a second floppy drive. DOS 3.00 is tailored to the 1.2MB floppy drive—and that means certain limitations as well as added storage space.

If you require data interchange via standard 320/360K disks, you'll need to add the AT's 320/360K floppy drive. The 1.2MB floppy drive can read and write in the 320/360K formats, but what it writes can only be read by the 1.2MB read/write head. That head is narrower—and thus more sensitive—than the read/write head in the PC's 320/360K drive.

Not surprisingly, the AT relies on new disk media capable of handling the higher-density format. IBM's high-capacity disks are designed to be formatted with twice as many tracks in the same 5¼-inch space—80 as opposed to the old 40. The high-capacity format uses 15 sectors per track, in contrast to the 8 used for disks formatted under DOS 1.00 or 1.10 and 9 for those under DOS 2.00 or 2.10. Data stored in the new format can't be accessed under DOS 2.00 or 2.10 without the addition of drivers. A box of ten high-density disks runs about $80, but the new format proves to be a better value per byte of storage than its predecessor.

Playing the Slots

The AT was built to grow. The machine features eight full-length expansion slots, each with a standard 62-pin connector that accepts boards designed for the PC's 8-bit data bus. Six of the eight slots are accompanied by an additional 36-pin connector that makes it possible to transfer data in 16-bit segments and address more than 1MB of memory.

The combination floppy and hard disk controller board fills one 16-bit slot on the Model 68, leaving seven slots free. The combination serial and parallel board takes up an additional 16-bit slot in the Model 99.

Power users can have a field day with the AT's potential for additional RAM. IBM has filled half of the 36 RAM sockets on the Model 68's motherboard with "memory modules," each consisting of two 64K-by-1-bit RAM chips piggybacked. (Nine regular 64K-by-1-bit RAM chips provide 64K of RAM on a PC; nine of the piggyback chips provide 128K.) The AT motherboard accepts only these unique modules, and only in increments of 18—thus supplying the Model 68's 256K of RAM. The Model 99 features 36 such piggyback modules, which fill the motherboard RAM sockets. To beef up the Model 68's RAM to 512K, you can buy a 256K memory module

Both AT models are built around Intel's 6-MHz 16-bit 80286 microprocessor, performing at a rate two to three times faster than the PC.

In a New Key

Andrew Fluegelman

Figure A: The AT sports a redesigned 84-key keyboard, complete with enlarged <Enter> and <Shift> keys and a segregated cursor keypad.

When the original PC was introduced, it seemed that every review included a mandatory paragraph criticizing the arrangement of the PC's keyboard and comparing it unfavorably with that paradigm of modern industrial design, the IBM Selectric typewriter. Three years later IBM has responded with a reconfigured keyboard for the AT.

The new keyboard incorporates several design changes (see Figure A). The <Backslash/Vertical Bar> key has been moved up to the right of the <Equals/Plus> key. This makes room for a left <Shift> key that, in true Selectric fashion, sits right next to the Z and presents a formidable target for diminutive or arthritic pinkies. Unfortunately, this rearrangement has reduced the size of the <Backspace> key and crowded it into the upper right corner of the keyboard—a full ½ inch farther from the home keys than on the keyboards of the original PC and the Selectric. For those typists who make false starts more often than they type capital letters, this change may not result in a net improvement.

The <Single Quote/Tilde> key has been moved to the <Esc> key's former location, making room for a greatly enlarged <Enter> key. That is a definite improvement. *1-2-3* users who have come to rely on the <Esc> key for its "back out" function will just have to retrain themselves to find it. The <Enter> and <Shift> keys are now labeled with words indicating their functions, although the <Tab> and <Backspace> keys still display only symbols.

The whole right cluster of keys has been regrouped into a more crowded configuration, with several of the keys reduced in size. This cluster is also ½ inch farther to the right of the main section of the keyboard than on the PC. The status of the <CapsLock>, <NumLock>, and <ScrollLock> keys is now indicated by lights above the right cluster. Because the AT's keyboard is bidirectional (in addition to sending characters, it also receives information from the AT), each light reflects the true state of these keys, responding when the state is changed by software or by the user.

The right cluster contains a new key–<SysReq>–which stands for "system request." When this key is pressed, the AT executes a "user interrupt," which is currently defined to have no effect. The interrupt will be used to select from among subsystems when XENIX makes multitasking a reality on the AT. Without redefining the interrupt, however, BASIC applications can be written to respond in a specific manner when <SysReq> is pressed.

The keyboard readjustment has created a new inconvenience. Typing the DOS global specifier *.* now involves either an impossible stretch between the <Period> key and the <Asterisk/PrtSc> key in the upper right corner or a multikey sequence using a shifted 8 key. So there's now another good reason to make use of a macro keyboard enhancer such as *Keynote*.

To accommodate all this, the keyboard enclosure is ¼ inch wider and ½ inch deeper than the PC's. The AT keyboard also sports a generous cord that measures more than 6 feet long unstretched and about 10 feet fully extended. PC owners won't have to decide whether all these changes represent an improvement, however, since the the AT keyboard will not work on the PC or XT.

A Wardrobe Change

Darcy DiNucci

The PC's new brother has outstripped its sibling, and the old hand-me-down wardrobe just won't fit. The PC AT's capacities call for an array of expansion modules and software better suited to its heftier frame.

The more powerful processor and memory capabilities of the new computer have opened up new possibilities for advanced uses of the personal computer, but they have also restricted some hardware and software swapping between the PC and the AT. The AT's memory is accessed in 16-bit segments, which the PC's 8-bit boards can't process. (Interestingly, the AT's 16-bit slots have a different design than the 16-bit slots in AT&T's new PC 6300, indicating that IBM will be contending with a company its own size in the bid for a new hardware standard.)

The list of IBM's PC hardware options that can also be used on the AT is short, and IBM's product announcement specifically states that any hardware not listed is not supported on the AT. The hardware left behind includes:

- 5161 Expansion Unit Model 1, 2, or 3
- 5181 Compact Printer
- 64K Memory Module Kit
- 64/256K Memory Expansion Option
- Prototype Adapter
- Binary Synchronous Communications Adapter
- SDLC Communications Adapter
- Asynchronous Communications Adapter
- 10MB Fixed Disk Drive
- 5¼-inch Single-Sided Disk Drive
- 5¼-inch Disk Drive Adapter
- Printer Adapter
- Fixed Disk Adapter
- 5¼-inch Full-Size Dual-Sided Disk Drive

The following is IBM's list of the PC hardware the AT can use:

- IBM Color Printer Model 1
- IBM 5152 Graphics Printer Model 2
- Printer Cable
- Printer Stand
- IBM 5151 Monochrome Display Model 1
- IBM 5153 Color Display Model 1
- Personal Computer Cluster Adapter
- Monochrome Display and Printer Adapter
- Color/Graphics Monitor Adapter
- Communications Adapter Cable
- Game Control Adapter

To fill the gaps, IBM released a line of memory expansion units, disk drives, and boards. The company also introduced several new options designed to take advantage of the AT's network file server capabilities.

The AT remains compatible with most of the software designed for the PC. DOS 3.00 is close kin to DOS 2.10, and most software that runs under DOS 2.10 should run under DOS 3.00, but other factors that

affect compatibility—such as the dependability of ROM calls—remain largely untested.

Along with its announcement of the AT, IBM published a list of more than 50 of the software products it distributes that are compatible with the new computer—and 11 that are not. Software written entirely with PC-DOS system calls will run flawlessly. Some copy-protected applications and those tied to the PC's 4.77-MHz clock rate will not run on the AT, whose throughput is two to three times greater than the PC's. Several software companies have tested their programs on the AT and have assured buyers of continued compatibility. Lotus Development Corporation, for instance, immediately issued a press release announcing the complete compatibility of *1-2-3* and *Symphony.*

In fashioning a new outfit for a new machine, IBM is looking to the future. The AT's 80286 processor and new operating systems give the machine unprecedented versatility: in stand-alone, single-user applications, in a multiuser/multitasking environment, and as a network server. New software geared to the PC Network will now be at least as important as the PC's single-user software, and new hardware that can capitalize on the AT's multiuser abilities will be a useful adjunct. Following the PC tradition, third-party manufacturers are likely to keep busy fulfilling the promise of the AT's flexibility.

expansion kit for $495. But before you can add the memory expansion board to the Model 68, you'll first need to fill the motherboard's RAM sockets.

Either AT model can accept one 128K memory expansion option once the motherboard is filled with RAM. This brings the machine up to 640K—the maximum addressable RAM in the PC's architecture. (The 8088 addresses 1024K of memory, but the last 384K is reserved for functions other than user RAM [see "How Much Memory Is Enough?" *PCW,* Vol. 2, No. 6].) Part of the appeal of the 80286 is its ability to address up to 16MB of RAM. Accordingly, IBM enables you to increase the 512K AT to 3MB, in five allotments of 512K—at $1125 per expansion board. Theoretically, products from third parties could boost RAM beyond 512K per board, which would enable RAM in the AT to exceed 3MB. All this RAM is open to PC XENIX users, but aside from DOS 3.00's VDISK (RAM disk) utility, DOS 3.00 function calls (upon which application programs rely) cannot recognize more than 1MB of RAM.

None of Big Blue's memory expansion options includes the new (and still scarce) 256K-by-1-bit RAM chips. All the new memory expansion boards for the AT require a 16-bit slot.

Managing Memory

What will you do with all that RAM? Tim Sammons, a consultant who heads Sammons & Associates in Berkeley, California, suggests that the AT's capacity will encourage users to rely on multiple RAM disks. "You'll be able to bring software and data into memory and then do your processing without repeated floppy disk reads. This increase in speed will be helpful in large data management applications," Sammons says. He's convinced that, over time, extra RAM will make software both easier to use and more intelligent. Help files and truly helpful error messages will be readily available and not confined to a disk. Expert systems and artificial intelligence in general, now suffering under the RAM limitations of current machines, may also get a shot in the arm from the AT's prodigious memory.

But perhaps the major assignment in store for the AT's extended RAM is multitasking—the capacity for one machine to execute several jobs simul-

3.00 and Counting

Harry Miller

The introduction of IBM's new PC AT is accompanied by the release of DOS 3.00 and BASIC 3.0, enhanced versions of the PC's most popular operating system and interpretive language. The enhancements are designed primarily to support the AT's hardware (specifically the 20MB hard disk, the 1.2MB floppy disk drive, and the clock/calendar), but they also add a few features to the PC, the Portable, and the XT.

VDISK

Among the most significant of the DOS additions is the VDISK (virtual disk) device driver, which makes it possible to set up a RAM disk emulator. A RAM disk sets aside a portion of the computer's active memory (RAM) to be used as if it were a disk drive. The advantage is that a RAM disk provides much faster file access or transfer than an actual floppy disk drive because the process is electronic rather than mechanical.

VDISK is a very simple RAM disk utility. To use it you include a statement such as **device = vdisk.sys 320** (which establishes a 320K RAM disk) in the CONFIG.SYS file on the disk you use to start the computer. The file VDISK.SYS must also be present on that disk. When DOS is first loaded, it automatically looks for a file called CONFIG.SYS and reconfigures the PC's operating system to include the devices listed in that file. If you don't already have such a file, you can create one from the keyboard. Enter the command **copy con: config.sys**, press <Enter>, and type **device = vdisk.sys** followed by a space and a number specifying the size, in kilobytes, of the RAM disk. Then press <F6> and <Enter>. The next time the PC is started with this disk, it will create a RAM disk called by the next drive designator. For example, if you already have two disks called A: and B:, the RAM disk will be designated C:; if you already have disks called A:, B:, and C:; the RAM disk will be designated D:. On the AT the VDISK utility enables you to utilize memory above the normal 1MB limit.

File Protection

The new DOS command ATTRIB protects the current contents of a disk file by marking the file with a read-only attribute, which lets the file be read into memory but does not allow the file on the disk to be altered in any way. The command might look like 'attrib +r *filename.ext*'. To allow changes to the file (i.e., to disable the read-only attribute), you would issue the ATTRIB command again, this time with a **-r**.

Labels

The new LABEL command enables you to change the volume label of a disk at any time. With DOS 2.00 or 2.10 a volume could be labeled only when a disk was formatted.

International Character Support
DOS 3.00 supports date and time formats as well as keyboard and display character sets for countries other than America. The COUNTRY statement in a CONFIG.SYS file sets the format for display of the date and time. The KEYB*XX* (Load Keyboard) command loads into memory a program that replaces the ROM BIOS keyboard program. DOS 3.00 supplies KEYB*XX* programs for the United Kingdom (KEYBUK), Germany (KEYBGR), France (KEYBFR), Italy (KEYBIT), and Spain (KEYBSP). The command SELECT combines the COUNTRY statement and the KEYB*XX* command. It uses DISKCOPY to make a new disk and creates a CONFIG.SYS file with the appropriate COUNTRY statement and an AUTOEXEC.BAT file with the corresponding KEYB*XX* command.

The command GRAFTABL loads into memory a graphics table of additional character data for the color graphics board, allowing the display of international character sets.

File Sharing
Also included in DOS 3.00 is the command SHARE, which provides support for file sharing and allocates the amount of file space for file-sharing information and for the number of file locks. In the single-user environment for which DOS 3.00 was designed, SHARE is of no use. But this DOS command prefigures DOS 3.10, 3.00's networking successor, which will rely heavily on file-locking and file-sharing capabilities.

BASIC 3.0
The additions to this new version of the ever-popular BASIC language are intended for the advanced programmer. The SHELL statement lets the BASIC programmer execute DOS commands and run DOS programs as "child processes" (programs run from within BASIC). The ENVIRON$ function and the ENVIRON statement are used to inspect and modify parameters in the BASIC environment table (such as PATH, BUFFERS, and FILES). The IOCTL statement and the IOCTL$ function let BASIC send and read control commands to and from installed devices and their drivers. The ERDEV and ERDEV$ read-only variables hold the error code and the device name when a device generates an error.

All the new BASIC statements, functions, and reserved variables are now, of course, reserved words, and programmers, especially novices, should not attempt to use any of them as program variables. Although not documented elsewhere, INTER$ is also included in the list of reserved words.

taneously. In this role, the 80286 truly shines. When multitasking applications are assigned to an XT, for example, there are no hardware circuits to keep tasks separate, and thus applications can write over each other in memory. The 80286 partitions memory, essentially setting up fences between segments of RAM. In this case, good fences do make good neighbors. The XT's 8088 can perform multiple tasks, relying on such window managers as *TopView* and *DesQ*, but RAM is defenseless against overwrites (see "View From the Top").

In addition to its multitasking prowess, the AT has the ability to function in a multiuser environment, enabling several users to share it simultaneously. The machine's supply of serial ports limits it to three users—two at work stations and one at the host.

In order for the 80286 to serve multiple users and perform multiple tasks safely, the AT requires an appropriate operating system. Enter PC XENIX, a version of UNIX System III adapted for IBM by Microsoft (see "IBM's UNIX"). The 80286 is capable of operating in two modes. Under multiuser/mulitasking XENIX, the chip works in the protected (that is, memory-protected) mode. When the AT runs under DOS, the 80286 operates in the compatibility mode—so called because the 80286 works with software for the 8088/8086 family of processors. When you boot the AT, the operating system used determines whether the machine is in the compatibility or the protected mode. (PCIX, a version of UNIX for the 8088, runs on the AT in the compatibility mode.)

The AT as Server

PC XENIX unquestionably makes good use of the 80286, but the AT's multitasking/multiuser operating system won't be available for a few more weeks. Applications written for XENIX may not be plentiful for quite a while, and with the AT initially supporting just three users simultaneously, IBM has only skittishly entered the PC-based multiuser market. Even if third parties load the AT with serial ports (which XENIX and the 80286 can handle easily), IBM has another communications role in mind for its latest machine. Networking is the name of Big Blue's new game.

At the time it introduced the AT, IBM unveiled its PC Network for resource and data sharing. The network places the AT at center stage as a file server capable of simultaneously acting as a work station. But consistent with its emphasis on peer-to-peer (that is, PC-to-PC) communications, the PC Network accepts an XT or another hard disk compatible as server.

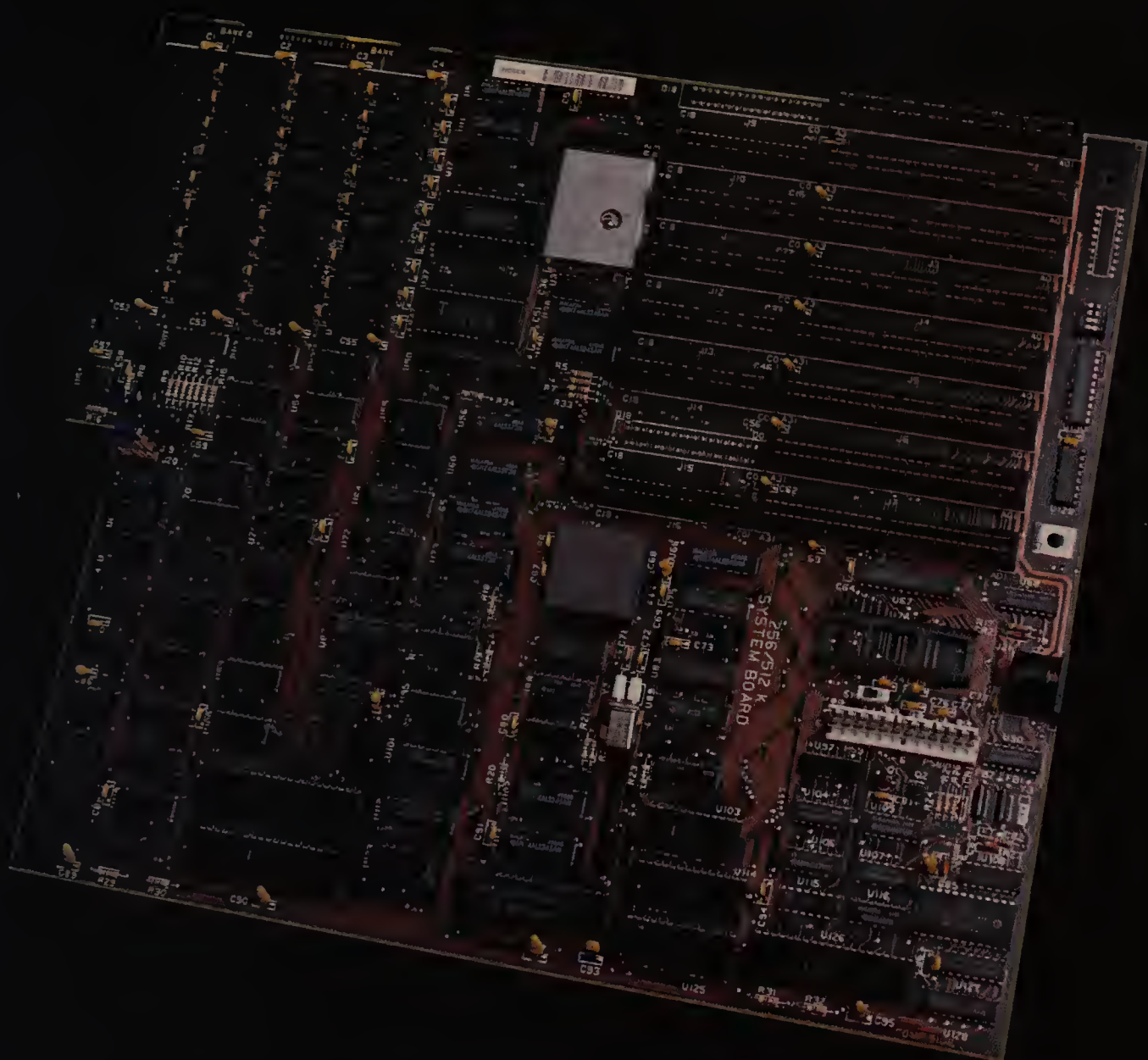
In this way IBM's PC-based LAN enables the company to maintain a "PC philosophy." IBM, after all, is interested in selling and linking PCs, not ASCII work stations. While a true multiuser system shares processing power among users who typically rely on dumb terminals, the PC Network fosters file and hardware sharing among users equipped with processors of their own.

Consultant Tim Sammons puts it this way: "Relying on shared logic systems diverges from IBM's basic strategy. IBM would rather have customers buy minicomputers, not personal computers, for shared logic." Will Zachmann, a market analyst with International Data Corporation of Framingham, Massachusetts, concurs: "Multiuser systems represent a much more limited market [than stand-alone personal computers]. Networking PCs is a perfectly viable alternative—one that individual managers prefer."

Betting on Broadband

Early this year IBM announced that its proprietary network to link PCs, minis, and mainframes would not be released for roughly two years. This ambitious network is based on a token-passing ring arrangement that relies on twisted-pair cabling. (In a token-passing ring configuration, computers are connected in a circle. A single "token," or signal, representing the right to transmit data on the network is passed around to each computer. Twisted-pair wires provide an inexpensive connection among computers and transmit frequencies over a single channel.)

Aware that market interest might burn out while the company fiddled, IBM released its version of a broadband PC-based network developed by Sytek, of Mountain View, California. (A broadband



The AT's motherboard features piggyback RAM chips, eight expansion slots (six with 16-bit bus connectors), and the 80286 microprocessor (the gray square in the center).

LAN links computers with a cable capable of rapidly carrying many signals at once.) IBM claims that the PC Network announced in August can easily be installed in a small business. Tim Sammons agrees, calling the LAN "ready-to-wear."

The PC Network consists of the kind of coaxial cable used for cable television, a $695 network board for each PC, and a $595 Translator Unit for each network. The translator, which converts the incoming signal to a frequency that all network adapters can receive, is connected by cable to as many as eight PCs in a 200-foot radius. Connecting more than eight PCs or extending the radius requires a Base Expander, which is essentially a repeater that boosts the signal.

The PC Network can link as many as 72 PCs within a 1000-foot radius. This is achieved through the use of Base Expanders and Short, Medium, or Long Distance Kits (which include cables and connect up to eight PCs each). IBM claims that with the addition of third-party hardware and installation help, the network supports a maximum of 1000 nodes within a 3-mile radius.

Data is transmitted throughout the network at a rate of 2 megabits per second via the CSMA/CD (carrier sense multiple access with collision detection) protocol. (CSMA/CD is a common, proven networking technique in which a PC sends a packet of data only when the network is quiet. If two PCs send a packet at the same time, each will recognize that the packets have been scrambled, then will alternately

View From the Top

Evelyn Spire and Karl Koessel

TopView, announced at the same time as the PC AT, is an "environment" designed to increase productivity by enabling you to run several programs concurrently and move easily among them to view or transfer information. *TopView* runs under DOS 2.00 and later releases on any member of the PC family with two disk drives. Using *TopView*, you can switch between programs that you already own without having to stop one and start another.

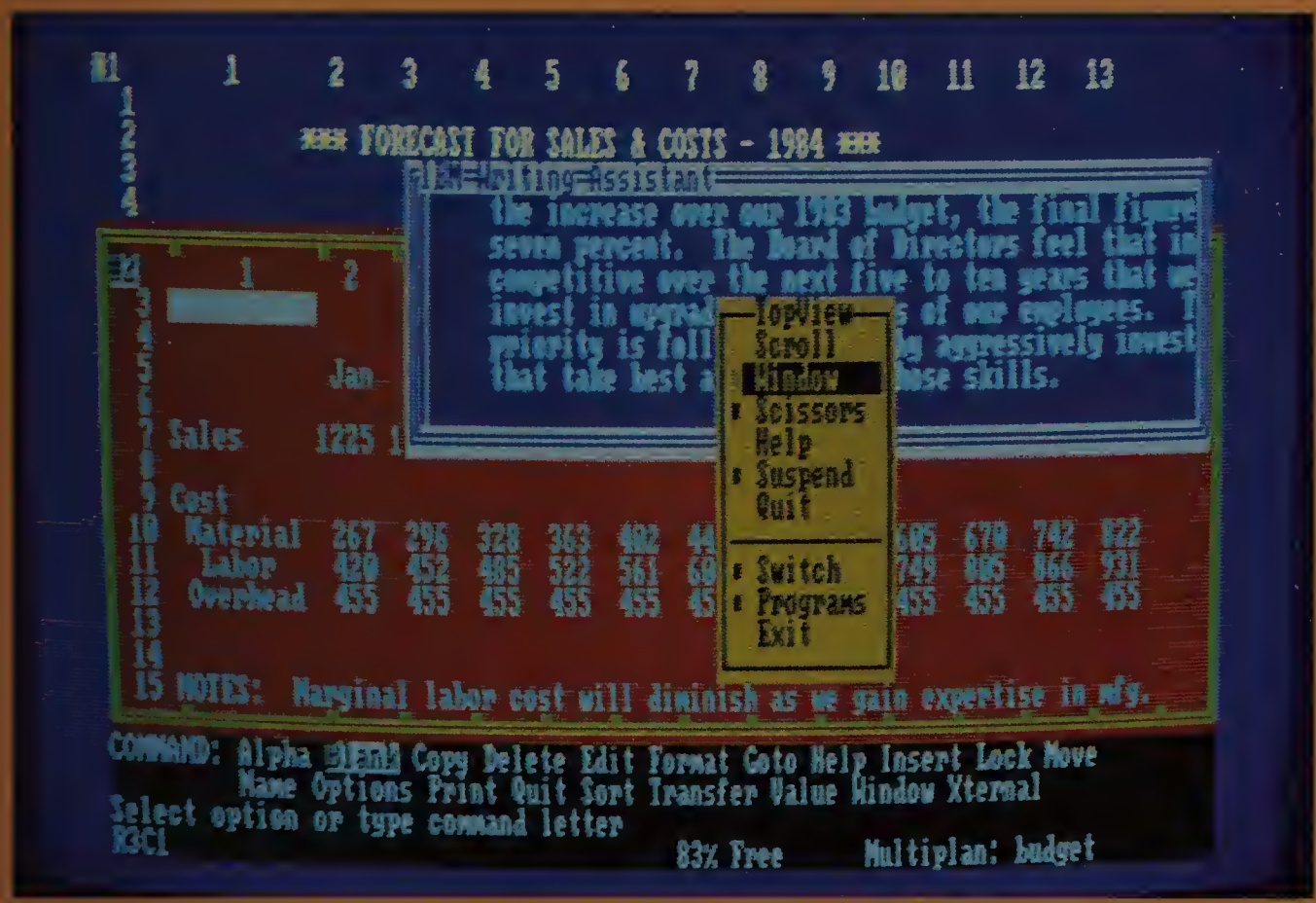
If you don't have an environment such as *TopView*, and you're writing a report that requires figures extracted from a worksheet, you have to save the report in its current form; exit the word processor; find the specific spreadsheet program and data disks; swap spreadsheet for word processing disks; load the spreadsheet and the correct file; find, mark, and copy the figures to a temporary file; exit the spreadsheet; swap disks again; load the word processor and the report; locate the cursor; and read in the figures from the temporary file. The length of this process may seem like a joke. It is. Many a manager has been seen cutting and pasting a portion of a spreadsheet into a report with scissors and tape rather than attempting the electronic method. Integrated programs make extracting figures easier, but you may want to use a word processor that isn't part of the integrated package.

When you're running *TopView* and want to use another application, you load the second program into RAM. All previously loaded applications remain in RAM but reside in the "background." Most of them will continue to run in the background. For example, a data base can sort a large file unattended while you type a letter. Because the size and number of application programs that can be loaded concurrently depend upon the amount of available memory, IBM recommends that *TopView* run on a PC equipped with 512K.

TopView gives each application its own "window." (A window is an area on the screen that a program uses to display its information as it runs.) Windows of separate programs are layered on top of one another. The "foreground" application–the one with which you are currently interacting–is displayed in what is called the topmost window. That window can occupy the entire screen or a portion of it. You can size it, move it, hide it, scroll text within it, or temporarily "zoom" it to occupy the entire screen.

Using a two- or three-button mouse, the cursor keys, or some other pointing device, you select options (such as loading another application, manipulating windows, and cutting and pasting) from *TopView*'s pop-up menus. At any time, one keystroke or click of a mouse button invokes *TopView*'s main menu.

TopView is text oriented, as are most best-selling software packages. *TopView* will run a graphics applica-



TopView is guided by a pop-up menu (the yellow rectangle) that facilitates running—and working on—several programs concurrently. In this example, the PC is running Multiplan and IBM's Writing Assistant.

tion (on a PC outfitted for graphics) or a program that reads directly from, or writes directly to, a text-mode screen. The latter type of application, however, cannot be "windowed," and it is given the entire screen while it runs. When such programs are moved to the background, they remain in RAM but their execution is suspended.

IBM is pitting *TopView* against other window-oriented multitasking environments (such as *Microsoft Windows* and Quarterdeck Office Systems' *DesQ*) vying to become the standard. IBM intends to give *TopView* full support, including the company's biggest software advertising pitch to date and a commitment to improving the program's capabilities and performance. At the present time *TopView* does not run batch files, automatically load applications, support all DOS commands (notably redirection) from within its environment, or manage data interchange beyond the simple cutting and pasting of text.

TopView should be on dealer shelves by spring. The *TopView Programmer's Toolkit* will also be released at that time to assist programmers in developing application programs to work with *TopView*'s features.

IBM's UNIX

Harry Miller

For the PC AT, IBM supports and markets the PC XENIX operating system, which is based on Bell Labs' UNIX System III. XENIX is both multiuser (providing centralized processing and file access for several users on the same machine) and multitasking (allowing several programs to run simultaneously). XENIX also includes the improvements to UNIX that were created at the University of California at Berkeley—the so-called Berkeley enhancements.

Because some of the new DOS 2.00 features, such as tree-structured directories and device drivers, were modeled after UNIX and XENIX features, elements of XENIX will be familiar to DOS users. XENIX can reside on the same hard disk as DOS and is capable of transferring files to and from DOS 2.00, 2.10, and 3.00.

XENIX can address the AT's maximum 3MB of user RAM and takes advantage of the 80286 chip's dynamic memory management and protection capabilities. XENIX supports the IBM Monochrome and Color Displays, but the Color Display can be used only in text mode. Any IBM personal computer can be used as a terminal under XENIX, and the system supports most standard ASCII terminals as well.

XENIX includes three program editors (VI, ED, and SED) and three shell command interfaces: The Bourne shell is a simplified programming language; the Visual shell provides a menu-driven environment resembling the command structure used in *Microsoft Word* and *Multiplan;* and the C-shell has commands and constructs similar to the C programming language.

Currently XENIX on the AT is limited to three concurrent users (two at terminals plus one at the main console), because each user terminal is connected to the AT by a serial port, and IBM provides only two serial ports for the AT. However, more users could be accommodated with the addition of an expansion board, furnished by a third-party manufacturer, that provides extra serial ports. (Indeed, third parties have quickly gotten into the act. Less than a month after the AT's introduction, Computone Systems became the first to augment the AT's multiuser capabilities. The company released a terminal controller board and operating software that enable the AT to accept as many as eight terminals, printers, and communications devices.)

XENIX expands IBM's UNIX strategy—one that already includes PCIX, a single-user, multitasking operating system that runs on the XT, and VM/IX, a multiuser version that runs on IBM mainframes. All three products are enhancements of UNIX System III. Thus far, these systems have been used primarily as product development environments. However, an increasing number of DOS application programs are being written in C for portability. The appearance of such programs for XENIX could make it a popular commercial environment as well.

check network traffic before re-sending.) From PC to PC, the data transfer rate is 200 kilobits per second. By using coaxial cable to transmit a broad band of frequencies, the PC Network can send voice and video as well as data.

A Network on Board

The heart of the network is the board, made by Sytek to IBM's specifications. The board fits into an 8-bit slot in any member of the PC family except the PCjr and the PC Expansion Unit. The adapter includes a pair of Intel coprocessors, the 80188 and the 82586, which operate at the same 6-MHz rate as the 80286.

The 80188, which incorporates the 8088 and support chips into a single unit, works with a 32K ROM module on the board to manage the network (including power-up, protocol processing, error detection, and transmission). The 80188 also governs the 82586, which controls communications with the network via an RF modem on the board. An 8K ROM module, the NETBIOS, serves as the basic input/output system between the network and the host PC. The software on the network board generates a "session-level interface" (that is, menus). The board also includes 16K of RAM, set aside as a buffer. IBM released the board in August in the hope that software developers would write applications directly for the NETBIOS.

Another DOS on the Way

PC XENIX doesn't support the PC Network, but DOS 3.10 does. When it is released in several weeks, DOS 3.10 will replace DOS 3.00 but not DOS 2.10. DOS 3.10, which IBM says will be available as a "trade-up" option for $30, is 3.00 plus support for PC Network hardware and software. DOS 3.10 will work with all members of the IBM PC family (except the PCjr) and will occupy the same amount of memory as DOS 3.00.

DOS 3.00 has file-sharing capabilities (via the SHARE command) but lacks 3.10's network "redirector" facility. According to Dave Crane, a Dallas-based consultant, the redirector intercepts application program calls (such as those for disk or printer services) and redirects them into the network as required. The redirector also fields responses from the network and passes them to the application program.

The PC Network requires LAN software in addition to that etched in ROM. The *PC Network Program,* priced at $75 and scheduled for release around the same time as DOS 3.10, will provide server capabilities for file, print, and message functions.

Crane notes that the *PC Network Program* will use DOS 3.10 to share resources and information among PCs. The majority of applications running under DOS are expected to work with the new server functions. "The software obviously controls the LAN hardware, but unlike a lot of LANs out there, it supports multiple file servers and peer-to-peer communication," Crane says. "Concurrent access to data by multiple users is also supported through sharing functions that still manage to maintain data integrity."

Whither Token Ring?

The PC Network is hardly IBM's last word on LANs. In addition to this peer-to-peer offering, IBM has endorsed the token ring LAN, an industrial broadband coaxial LAN, and the PC Cluster announced last spring. Mindful of these seeming disparities, Big Blue has issued a "statement of direction" affirming its intention to connect all its networks. IBM is especially committed to building a bridge between the local broadband PC Network and the potentially more pervasive token ring plan. "PCs will be able to be attached to both networks," says Bill Osborne, a senior planner for IBM. "There are multiple ways of doing so, and we could do it now—it's not a technological problem."

(Of all of IBM's networking strategies, the PC Cluster remains the most rudimentary. The PC Network permits file sharing using hard disks as servers, but the PC Cluster doesn't. [See "PC to Go . . . ," *PCW,* Vol. 2, No. 5.])

Tim Sammons, who relied on Sytek's LAN in wiring the Democratic National Convention last summer, points out that the IBM/Sytek network fills a

definite need. "It enables incompatible equipment–printers, character readers, and so on–to communicate," Sammons says. "But Sytek is not the answer for everyone–it's primarily for those who have an eclectic mix of equipment already. Sytek doesn't provide top-flight integration, just a good level of performance."

A New Pitch

With the AT batting cleanup, IBM is a formidable player in the network ball game. But the new computer is surely among Big Blue's most complex small machines, and gaining mastery of its standalone and communications characteristics may entail a lengthy learning process.

"For some organizations, this could even be a first computer," says IBM's David Camm. "The network will provide interesting capabilities, but I don't want to categorize the AT's market size or the machine's niche. Let's just say that the facility for expansion is there."

Ken Greenberg is an Assistant Editor at PC World. *Karl Koessel is the magazine's Technical Editor.*

IBM PC AT
IBM
Entry Systems Division
P.O. Box 1328
Boca Raton, FL 33432
800/447-4700, 800/447-0890 Alaska and Hawaii, 800/322-4400 Illinois
List price: Model 68 $3995, Model 99 $5795, 128K memory expansion option $350, 256K memory module kit $495, 512K memory expansion option $1125, 1.2MB disk drive option $650, 20MB hard disk option $1595, 360K disk drive option $425

PC Network Hardware
IBM
List price: network board $695, Translator Unit $595, Base Expander $59, Short Distance Kit $39, Medium Distance Kit $79, Long Distance Kit $89, 25-foot cable $29, 50-foot cable $39, 100-foot cable $59, 200-foot cable $99

PC Network Program
IBM
List price: $75

TopView
IBM
List price: $149, Programmers Toolkit $395

PC-DOS 3.00
IBM
List price: $65

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IBM
List price: $65

PC XENIX
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List price: $395, software development system $455, text formatting system $145

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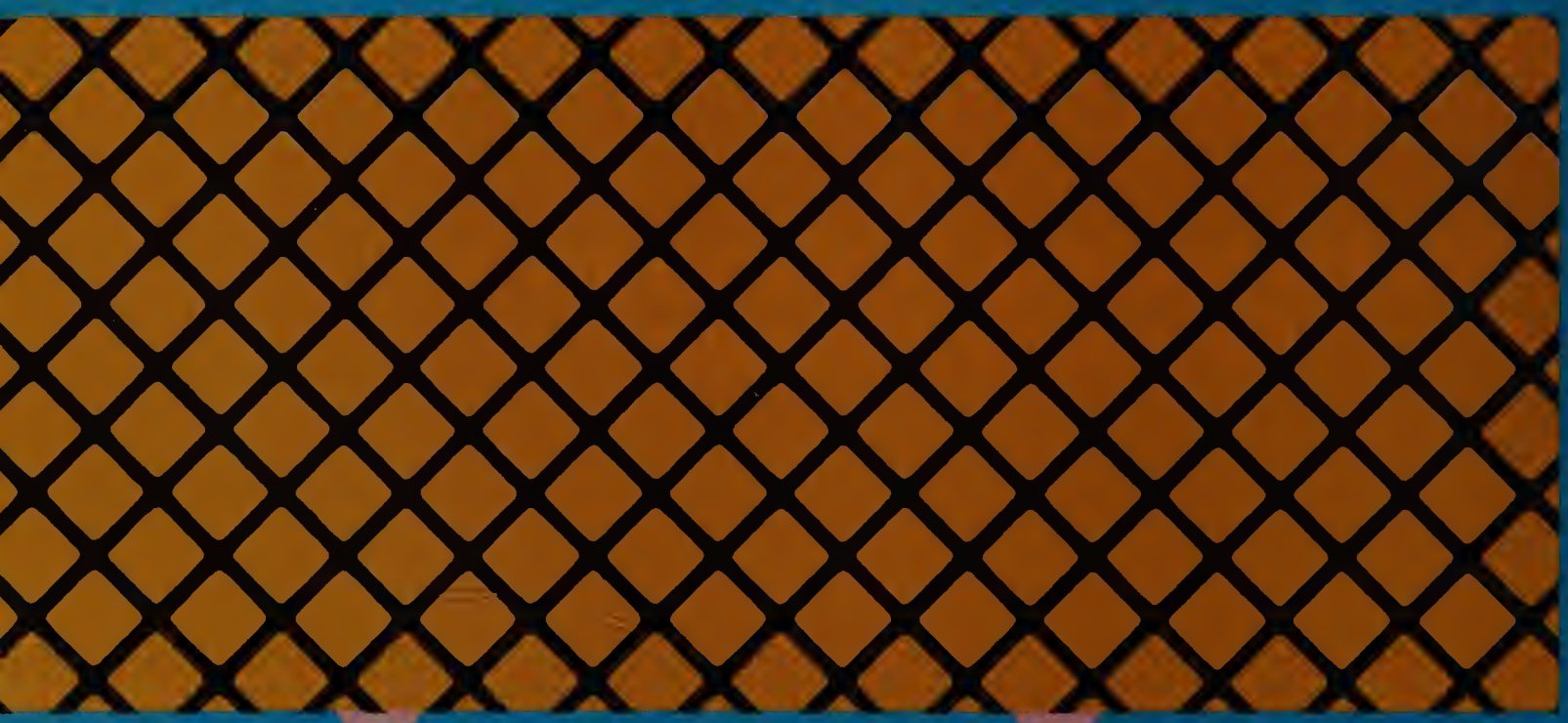

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adjustable bar widths
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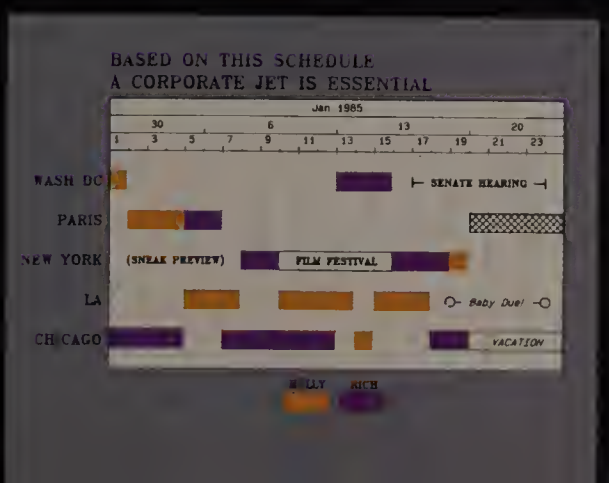

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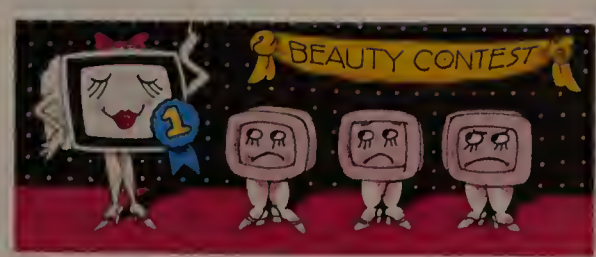

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PC in the Sky

Feeding the PC data from the Landsat satellite results in visually remarkable—and exceptionally useful—images.

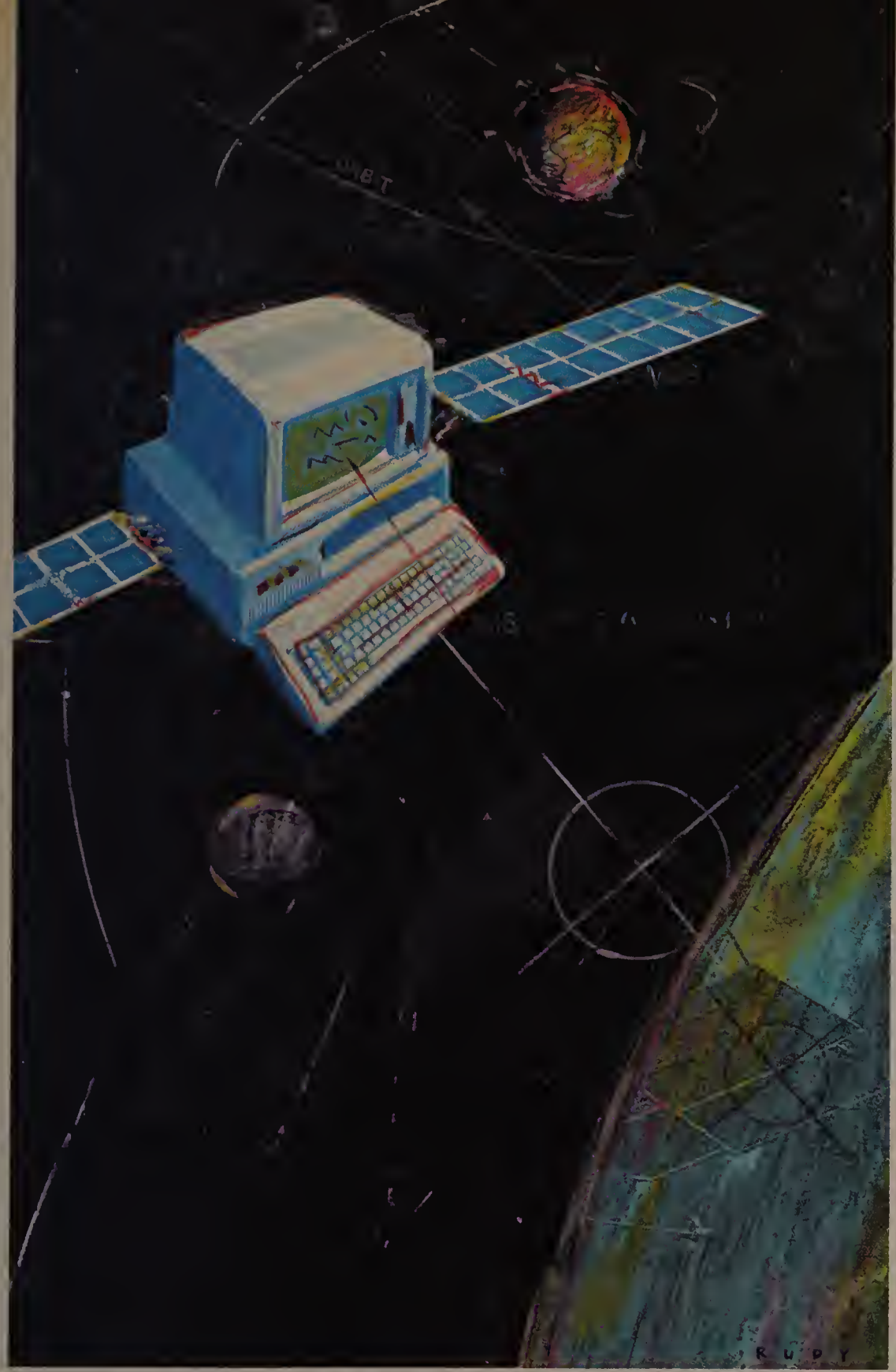
Jonathan Littman and Mary Friedland

The scene is a small potato farm in Oregon. To determine optimum irrigation and fertilization techniques, the farmer who tills this land has begun to rely on satellite pictures. These "photos" aren't taken with a camera, and they contain more information than any lens—or eye—could see. The farmer is on the receiving end of a sophisticated microelectronic relay team: the satellite senses Earth's radiation, records it in digital form, and transmits the information to a personal computer equipped with software that processes the data into a photolike image. The results of this procedure, called digital image processing, are no small potatoes.

The potato farmer with the satellite dish by his shed and the PC in his office is probably months, not years, away. But bigger and better crop yields are merely one dividend of digital image processing—a potential PC application that also promises breakthroughs in plastic surgery, industrial design, and innumerable other endeavors. Digital image processing represents a marriage of established computer and space technologies; the looming innovation (like the personal computer itself) may soon make elaborate and expensive techniques accessible and affordable to individuals.

July 9, 1982, was a red-letter day for digital image processing. On that day the National Aeronautics and Space Administration (NASA) sent aloft Landsat (land remote-sensing satellite system), a satellite designed to gather pictorial data on Earth's resources. Landsat incorporates advanced sensing equipment designed to record perceptions of the planet digitally. Completing one orbit of the earth every 99 minutes at a distance of roughly 500 miles, the satellite relays images of the entire globe every 16 days.

Based on NASA's objectives, Landsat is an unqualified technical success. But at a press conference later in 1982, a reporter posed a thorny question: without a mainframe computer equipped with expensive software, what good was the information? IBM's Ralph Bernstein, a senior advisor on the project from IBM's Scientific Center in Palo Alto, California, acknowledged that he had no satisfactory answer. Little work had been done to make digital image processing technology widely available.



Bernstein was intrigued by the prospect of moving the mainframe-based digital imaging system to a microcomputer. En route to the Scientific Center one morning with colleague Joe Meyers, a veteran programmer, Bernstein proposed an experiment. He would define the algorithms to do image processing on the PC if Meyers would do the programming. Meyers agreed, and in two months the team had developed a rudimentary PC-based program capable of processing Landsat's digital images. In February 1983, the pair demonstrated the software, which was written in Advanced BASIC with some assembly language code, at NASA's Goddard Space Flight Center in Greenbelt, Maryland. Within a year, they had refined the program sufficiently to exhibit it at the Landsat Users Symposium in Santa Barbara, California.

Although you can't buy software based on the Bernstein/Meyers collaboration yet (see "Ingredients for Success" for proposed requirements), and IBM remains mum on its product plans, image processing on the PC is no longer confined to theory. Hardware-intensive systems are already available for the IBM PC XT, and it's only a matter of time before this potentially vast resource becomes common in fields as diverse as agriculture, mineral exploration, and medicine. PC-based image processing has even been used to monitor the delicate habitats of endangered species.

What's especially noteworthy about the IBM team's system is that it performs basic image processing with off-the-shelf hardware, so this rich capability may soon be available to the thousands of PC users.

Maintaining an Image

An image-processing application begins with "imaging"—the method by which Landsat collects data. Landsat contains two imaging devices: a multispectral scanner, which checks the intensity levels of various wavelengths of light; and a thematic mapper, which measures the temperature of an object. Each device works like a video camera and has a grid of sensors that measure the electromagnetic radiation that all objects emit or reflect; the grids determine the resolution of the image. Both devices translate the emission levels measured by each component of the grid into digital

Ingredients for Success

Jonathan Littman

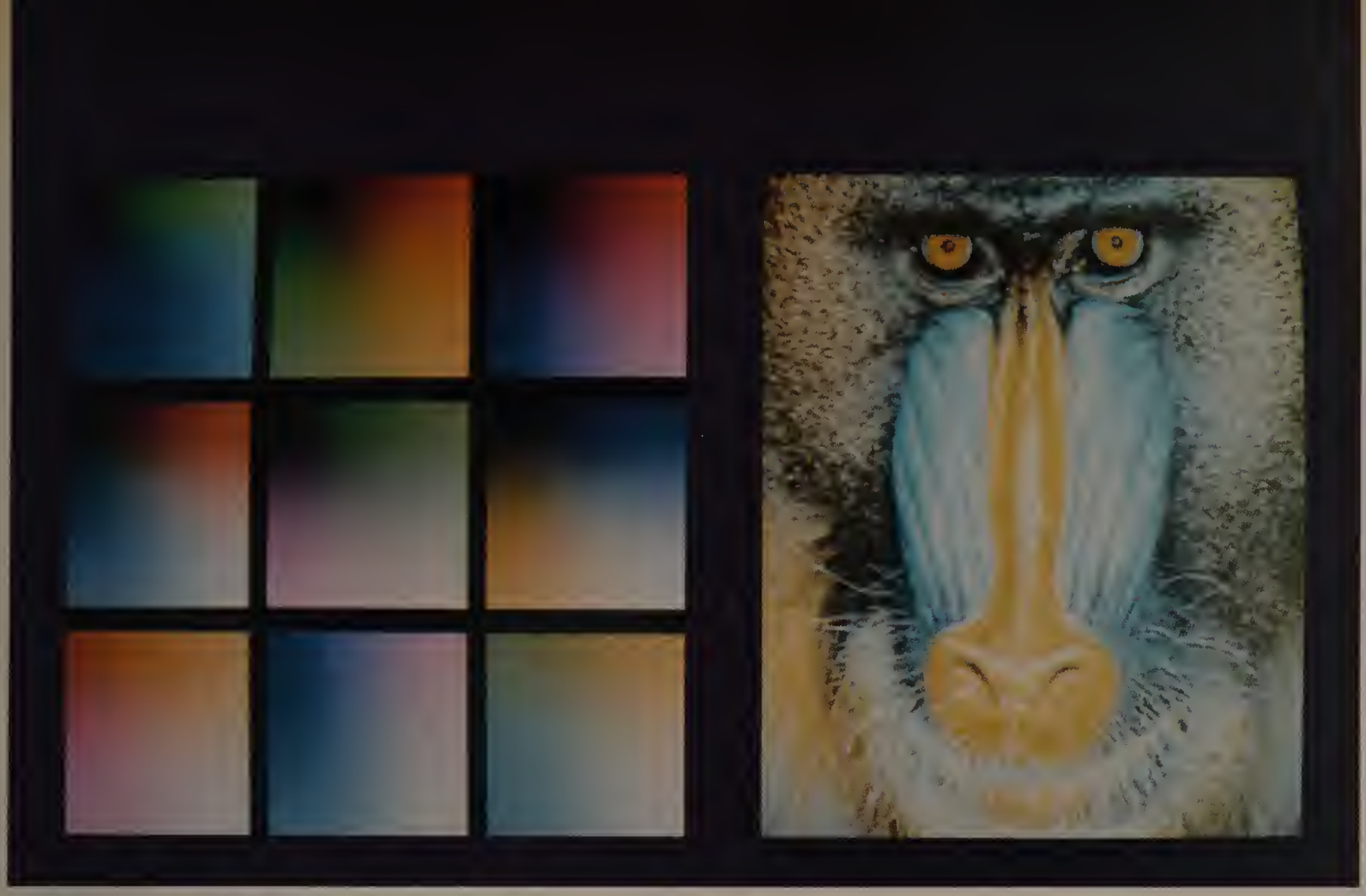
The PC image processing system devised by IBM's Joe Meyers and Ralph Bernstein achieves a high level of sophistication with relatively inexpensive, off-the-shelf hardware. Development costs of the program—for hardware and software, less labor—ran slightly more than $6000. (Keeping costs down is a particularly noteworthy feat in light of the price tag for a typical mainframe image processing system: anywhere from $250,000 to $1 million.)

To confirm his hunch that the PC could handle image processing, Meyers wrote the program in Advanced BASIC and some assembly language code. He did not compile the BASIC programs (which would have abbreviated processing time). Meyers and Bernstein also complied with a self-imposed "limitation"—every scrap of hardware wore the IBM logo. Although excellent imaging systems are being built with other equipment, it's a tribute to Big Blue's versatility that such an advanced system could be constructed entirely in-house.

Hardware	
System unit with 64K, keyboard, double-sided disk drives, and disk drive adapter	$2633
Monochrome display	$345
Graphics printer	$595
Color printer	$680
Two 64K memory module kits	$330
64K/256K memory expansion option	$350
Communications adapter cable	$75
Asynchronous communications adapter	$120
Monochrome display and printer adapter	$335
Color graphics monitor adapter	$244
Printer cable	$55
(Subtotal)	$5762
Software and documentation	
DOS and BASIC language extension	$40
IBM macro assembler	$100
Asynchronous communications support	$60
Personal editor	$100
Technical reference manual	$36
(Subtotal)	$336
Grand total	$6098

Figure A: Meyers and Bernstein's off-the-shelf building blocks

The requirements for the Meyers/Bernstein prototype system are listed in Figure A. Prices have been furnished by IBM; they do not include an estimated retail price for the image processing program itself. Were the collective labors of Meyers and Bernstein packaged as a software product, the program would bear a price tag anywhere from $1000 to $5000, according to sources at IBM.



To produce this photograph of the XT screen, Professor Ronald Lyon ran a demonstration program and generated a digitized image of a mandrill. At the left are color patches, also included in the demonstration program, that show 256 hues and levels of brightness for each color block.

values. From its orbit, the satellite evaluates patches of earth as small as 30 square meters.

These values are eventually telecommunicated to mainframes that store the data on magnetic tape at a ground station. This data is then imported to the PC via a local area network and recorded on 5¼-inch floppy disks. Five 64K images are stored on each double-density disk. (64K is the amount of memory used to store the number of dots, or pixels, that the PC's RGB monitor will display in the 320-by-200 mode.)

The Bernstein/Meyers image-processing software translates the values into colored pixels that form an image on the PC screen. The software produces an image of various colors—ideally one or more colors for each wavelength that Landsat recognizes. The colors can represent such things as a body of water or the vegetation surrounding it.

Sharpening the Picture

Because the PC's medium-resolution color graphics mode displays only four different colors, the original image is often crude. The image must, as Meyers says, be "equalized," so he wrote a program to accomplish that task. The program uses statistics to determine which of the PC's four colors should represent an element of the Landsat image.

The next step in balancing the color display is to clarify the image. This occurs through a method commonly referred to as "classification." Thematic classification is simply the highlighting of any elements, or themes, of interest. Suppose, for example, that a city planner wanted to accentuate the bodies of water in an urban area. The planner might rely on a technique that Meyers calls "boxcar training," which involves placing two sets of parallel lines (the "boxcar") around a portion of an image selected as a prototype. The technique enables the planner to use his or her knowledge about the prototype to obtain more information on the rest of the image.

In this case, an image of a river could be "boxcarred." Meyers's equalization program could then used to determine the mean and standard deviation for the river's image value and to assign the

In this screen shot you're looking at Farmington, New Mexico, through the "eyes" of Landsat and Professor Lyon's XT. Lyon's image-processing program highlights areas of interest, such as the section marked by the horizontal orange band at the top.

river's image a minimum/maximum value. Any pixels falling within that range would then be considered "water." The planner could make the water more prominent by displaying it against a background of a different color or could obtain information by calculating such things as the percentage of the total image made up by water.

The boxcar method has broad applications, according to Meyers. Foresters, for example, often need to identify the amount of brush in a particular locale. A forester can create a boxcar around an area known to contain brush. A new "classified" picture will then show brush that was muted or hidden in the original image. Similarly, farmers need to know if parts of their fields are deficient in water or minerals. By zeroing in on an area acknowledged to be doing poorly, a farmer can discover otherwise undetected problem areas.

The Meyers/Bernstein program can also "filter" an image. The net effect is something like applying Vaseline to a camera lens in order to obtain a gauzy, impressionistic image. By simply striking a key or two, it's possible to smooth the edges where colors meet or to soften the entire picture.

Putting XTs Together

Meyers and Bernstein are pioneers in image processing for the PC, but they're not alone. Geologist Ronald Lyon, a professor of mineral exploration and the director of Stanford University's Remote Sensing Laboratory, isn't restricted to one vendor's hardware, as Meyers and Bernstein are. With fewer constraints, Lyon has been able to take the work of Meyers and Bernstein in exciting new directions.

Stansearch, Lyon's project, uses a PC XT, an XT expansion chassis, and other equipment to emulate a mainframe imaging system—at what Lyon says is 1/15 the cost. Lyon has worked with digital image processing since Landsat was first launched. His Stansearch software, which is written in IBM assembly language and Microsoft's FORTRAN-77, served as the model for the privately written *Remsearch-83* imaging program (see "A Hardware Shopping List"). At $25,000, Lyon's system is more expensive than the Meyers/Bernstein program, but Lyon is convinced that it's still a bargain. "Normally a mainframe imaging system runs $250,000 to $1 million," he says. "We have essentially replaced a huge and expensive system with our own."

Lyon's system achieves high resolution with the aid of three Artist-II color graphics boards. These boards increase screen display to 512 by 408 (nearly a quarter of a million) pixels—almost four times that of the IBM software. Displaying that many pixels requires roughly a megabyte of memory. Using three color boards means that as many as 4096 different colors can be displayed.

The Stanford program was written with the number-crunching 8087 coprocessor in mind; when the extra chip is installed in the XT's motherboard, the additional routines that Lyon's software requires are executed with alacrity.

Because the PC's medium-resolution color graphics mode displays only four different colors, the original image is often crude.

Lyon anticipates revising his system for a 32-bit microprocessor running a version of UNIX, but he's unsure just how soon such a revision will be necessary.

Down to Earth

The IBM and Stanford systems pay more attention to input than to output, at least hard copy output, primarily because the means to print what the PC captures still exceeds the budgets of most users. The price of sophisticated ink-jet printers and plotters, which offer from 16 to 32 colors, will eventually descend from the stratosphere, but Lee D. Miller, a professor at the Nebraska Remote Sensing Center and a leader in the field of microcomputer-based image processing, suggests that display and printing technologies are the least critical aspects of the process. Miller feels that digital image processing will become significantly more accessible to the typical user as soon as the technology offers two additional capabili-

A Hardware Shopping List

Jonathan Littman

For Stanford University professor Ronald Lyon, director of the school's Remote Sensing Laboratory, the chance to create an image processing system was a Christmas dream come true. Under Lyon's tree were virtually all the hardware and software tools needed to develop a PC-based digital imaging product.

Stansearch, Lyon's university-affiliated project, evolved into *Remsearch-83*, an imaging program that Lyon developed outside of Stanford sponsorship. Because Lyon's mission was simply to build the finest program he could, *Remsearch-83* takes advantage of a vast array of hardware. Lyon's shopping list for the package is enumerated here.

- A PC XT system unit (256K RAM, 10MB hard disk, one 360K floppy disk drive, 8087 coprocessor): $5250
- A PC XT expansion chassis with a 10MB hard disk, eight expansion slots, and a 130-watt power supply (increasing the available slots to ten large and six small, and the total power supply to 260 watts): $2500
- A Mitsubishi high-resolution color monitor: 13-inch model $2350; 19-inch model $3950
- Three Control Systems Artist-II color boards (permitting 16 variations of each color): $4800
- An IBM Monochrome Display (for text applications): $345
- A Cipher tape backup unit: M-890 (75 inches per second) $5100; M-891 (120 ips) $6500
- Overland interface board for Cipher tape backup unit: $750

For hardware alone, Lyon's project requires an outlay in the $20,000-to-$30,000 range. Not included are such optional items as plotters, printers, digitizers, and so on. Software isn't much cheaper: *Remsearch-83* source code lists for $15,000; compiled run-time codes for $5000.

For more information contact Remote Sensing Consultants, 860 Tolman Dr., Stanford, CA 94305, 415/494-2004.

ties: the ability to move large amounts of digital information quickly and an improvement in the level of detail that satellites can relay.

The most economical way to transmit data rapidly, Miller says, would involve a TV screen or modified TV transmission. The amount of raw data a typical user might need could easily be accommodated by that existing technology, and data would be available on demand.

Work has already begun on enabling satellites to zero in on much smaller bits of terrain. The process commenced with the "commercialization" of Landsat itself. As part of the space agency's mandate, NASA has put its eye-in-the-sky up for sale. Once Landsat is privately owned, individuals and companies interested in the data it produces will have direct access to regular transmissions. And next year the French will launch a satellite capable of rendering detailed images as small as 10 square meters.

Applications to Spare

Which individuals and companies will use Landsat's images, and from what fields will they come? The pioneers of image processing agree that the initial major applications are certain to involve agriculture, mineral exploration, oceanography, and medicine.

Agriculture. Stanford's Ronald Lyon explains that image processing may become an integral part of the care and cultivation of virtually any crop. "If a plant–say cotton, for example–is dry, an aerial scanner would 'see' it as different from a crop that is properly

Image processing programs allow you to "zoom in," as these screen shots of the San Francisco peninsula illustrate.

irrigated," says Lyon. "In this way, farmers can identify dry plants and get water to them before yields are affected."

Ideally, according to Lee Miller, image processing systems will monitor crops on a routine basis: "There's no reason why a farmer won't be able to have a small satellite dish. Every week or two, new satellite transmissions will be received, bearing fresh images of the fields below."

Image processing will also serve as an early warning system for possible soil deficiencies. For instance, soil containing copper sulfate (which can endanger crops) gives off a yellow cast in processed images. Lyon is convinced that image processing will help point to relationships that can't be established in any other way. "Examining a digital image of a hill of aspen trees may reveal color abnormalities—one side may be brighter than the other in a way you didn't expect. You may stumble on something in the soil such as a potentially valuable mineral."

Mineral exploration. Lyon considers locating mineral deposits to be the ideal image-processing application. Satellite renderings often reveal geological fissures that may be signs of mineral or oil deposits. Traditionally, mineral exploration has been conducted in areas about which little information exists. In such cases, a preliminary satellite picture can be of enormous help. Lyon notes that digital imaging is already being used to explore several remote regions of China.

Oceanography. The fishing industry will most likely reap big gains from PC-enhanced satellite data about ocean conditions. At the Scripps Institute of Oceanography in San Diego, water temperatures gleaned from a weather satellite are put through the institute's image processor to create a contoured temperature map. This map is then telecommunicated to tuna fishermen, who create simple dot matrix printouts of the contours. Because plankton is often concentrated where warm and cold waters meet, these maps direct tuna boats to pockets of plankton—and to the hungry tuna that feed on it.

Medicine. Curiosity motivated Professor Werner Frei, associate director of the Institute of Physics and Imaging Science at the University of Southern California, to develop an image-processing system for his PC. For the past decade, Frei has conducted research on digital image processing for a variety of groups, including the U.S. Department of Energy.

Frei, whose specialty is medicine, suggests that PC-based image processing may change the way physicians regard X rays. At present, Frei says, physicians and hospitals shuttle large numbers of X rays among themselves. This traffic degrades the quality of the

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X rays and may even increase the need for additional X rays. According to Frei, hospitals are beginning to store X rays digitally via picture archival and communications systems (PACS). With this tool, a doctor can call up an image from any one of several viewing stations, zoom in on the target area, and even enhance the image—thereby aiding treatment of injury and disease.

Plastic surgery ranks among the more dramatic potential applications of PC-based image processing. Explains Frei: "Work on facial bones can be unpredictable. Only a physician with a great deal of experience can foresee how the skin will stretch and how the reconstructed face will look." Computer simulation via image processing eliminates much of this guesswork. Simulation can be accomplished either by digitizing photographs of a patient or by creating a blueprint for a physical model that encompasses the reconstructed features. Using a model to predict the results of an operation enables the patient to preview his or her new look and even alter the outcome a bit.

Robotics. If helping to rebuild body parts isn't a sufficiently futuristic application, how about fashioning eyes for humanoids? Frei suggests that conferring some sense of sight on robots is a plausible task for image processing. As robots become integral members of the assembly line, the need for these helpers to collect visual information will increase.

PC-based image processing may enable robots to take digital snapshots of work environments and then analyze that data. Such a capability would effectively permit a robot to spot trouble on the conveyor belt or elsewhere in the immediate workplace. A mainframe-based application to process digital images is already in the works, and Frei thinks the process may be amenable to personal computers as well.

Mainframe to Micro

Nebraska's Lee Miller worked on microprocessor-based image-processing systems years before the advent of the PC. He remembers how large organizations once "looked down on micro-based image processing." In some ways, Miller and his colleagues have had to reinvent the wheel. Noting that micro-based systems are pokey compared to their mainframe cousins, Miller admits to using "wheelbarrows to do what others use trains for."

Like Miller, Frei developed a system that duplicates many of the functions originally performed on a mainframe. PC-based systems are viable, he asserts, because the fact that they have less processing power than mainframes isn't truly significant. "If you can wait a few minutes, the differences between the two systems aren't that great," Frei stresses. "Processing time can be speeded up."

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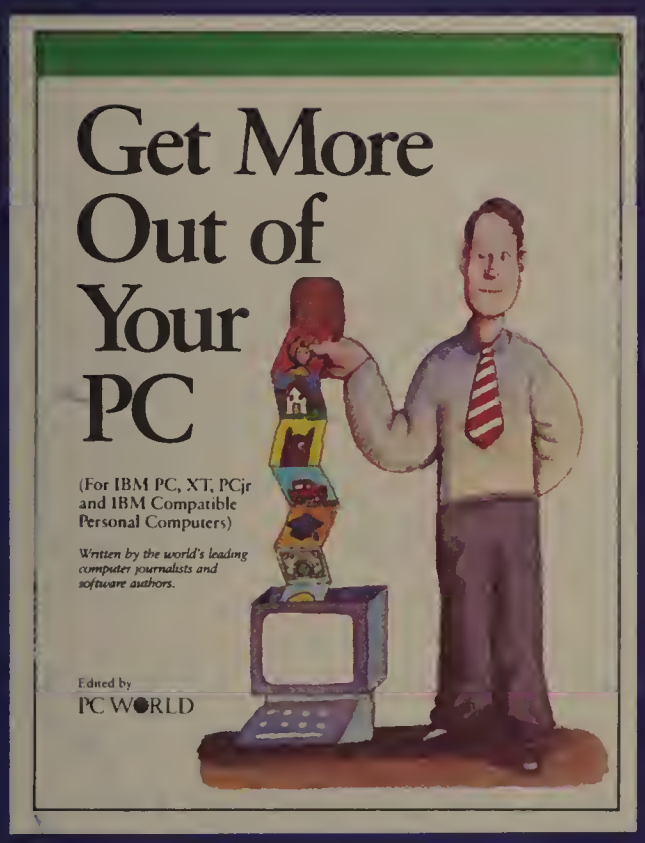

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While some see the PC's limited display size as an insurmountable obstacle, Miller disagrees. "Those who argue that you can't achieve high-quality image processing without a mainframe aren't addressing the right question. The question is, who can benefit from image processing? In Nebraska, one obvious answer is thousands of independent farmers."

Miller says that PC-based image-processing systems can detect crop losses before those losses become severe. "The farmer may find that the costs of the cure outweigh the increased yield," he notes, "but for a change, there will at least be a choice."

Attractive prices may soon get the ball rolling for an entire genre of image-processing software. Miller feels strongly that micro-based image processing is important, not just because it may prove economical, but because it will give the individual control over his or her data.

Indeed, when it comes to image processing, Miller is a true believer. "What the satellite sees and the PC processes is of little value unless it's put into the hands of the individuals who make decisions," he says. "The American way works best when decisions are made by those closest to a specific situation. And PCs are entering the diffuse process of decision making because they support that individuality." Big Blue may be listening to this approach. Although Miller's work has largely been with Apple computers, his contribution to image processing is so extensive that IBM recently invited him to give a seminar at its Palo Alto Scientific Center.

With technology advancing at a brisk clip, Miller is convinced that it's only a matter of time before the image processor is as common as the car radio. "Why can't an automobile receive imaged satellite maps on a little viewing screen?" he wonders. "Any time you're driving, you'll have a bird's-eye view of the surrounding area. If you're lost, you can figure out where you are. If you're on vacation, you'll be able to see the tremendous scenery just over the hill—and take that magical little detour you otherwise would have missed."

Not a bad prognosis for a so-called "pie-in-the-sky" technology that up to now has been the exclusive domain of government agencies, universities, corporations, and think tanks.

Jonathan Littman is a freelance writer working in the San Francisco Bay Area. Mary Friedland writes and edits technical and instructional books in the San Francisco Bay Area.

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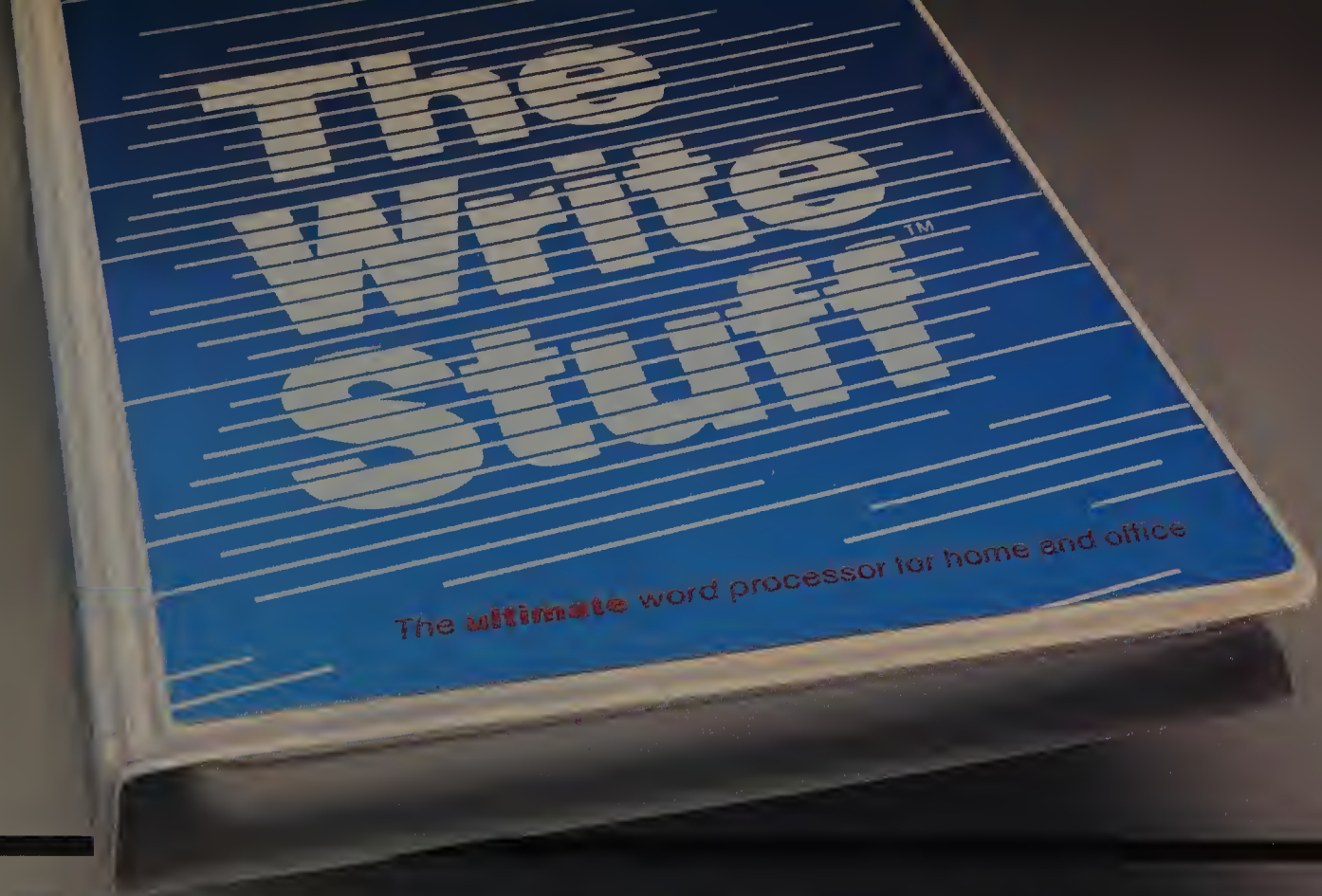

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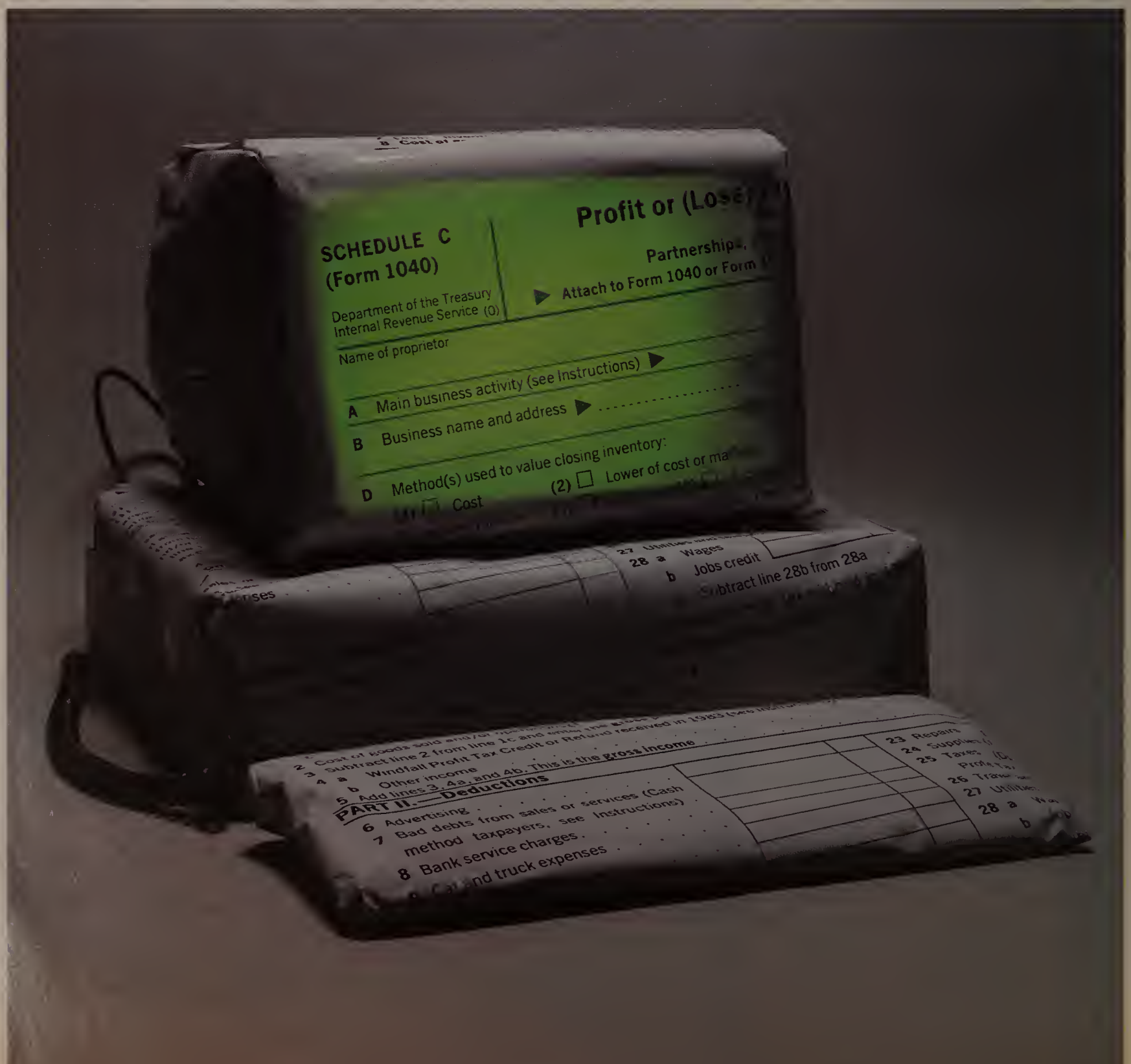

Thinking of claiming your IBM PC as a tax deduction? In the latest revision of the tax code, Uncle Sam has made a difficult task even harder. A former IRS auditor offers pointers.

Ralph Soucie

What the Economic Recovery Tax Act of 1981 gave in greatly enhanced benefits for new investment in business equipment, the Tax Reform Act of 1984 partially takes away. Congress has scaled back tax benefits for certain types of property, including personal computers.

Under the old law, if you could prove that your PC was an "ordinary and necessary" part of conducting an active trade or business or that it was "used in the production, collection or preservation of income," you could claim the same tax benefits enjoyed by Exxon or General Motors. The new law forces you, as a PC owner, to meet a tougher standard before you can reap the full benefits of the 1981 act.

Benefits Galore

What are the "full tax benefits" awaiting you? (See "Can Your PC Survive a Tax Audit?" *PCW*, Vol. 2, No. 6.) In brief, you may still depreciate the business portion of your computer over five years. This may be done by deducting 15 percent of the cost the first year, 22 percent the second, and 21 percent each year over the remaining three years.

In most cases you may claim an investment credit, which is a direct reduction of your income tax equal to 10 percent of the cost of your PC. Taking the 10 percent credit will effectively reduce your depreciation deduction by 5 percent; you can avoid this, however, by claiming a flat 8 percent credit.

If the depreciation and investment credit options seem too complex, you can simply elect to write off your PC investment (up to $5000) in the year you place it in service. This option is called "expensing."

This array of choices–depreciation, investment credit, and expensing–constitutes the "full tax benefits" initially conferred in 1981 (see "Deducting Your PC"). Failing to comply with the new rules means receiving only a watered-down version of these potentially significant tax breaks. (A word of caution: there are myriad exceptions to these general principles, and you may need professional tax advice to help sort it all out.)

One other general modification of the tax code bears directly on personal computer users: the rules for expensing business property have changed. When expensing was first allowed in 1982, it was limited to $5000 per return (or $2500 for a married taxpayer filing separately). The $5000 limit was scheduled to increase to $7500 for 1984 and 1985, then settle at $10,000 in 1986. The new law postpones those increases until 1988 and 1990, respectively, keeping the current limit at $5000. This change pertains to all eligible property, not just to computers.

The 50 Percent Test

Until the latest changes, an IRS audit was tough going if you sought to deduct your computer as an employee business expense. If you purchased your PC after June 18, 1984, taking such a deduction will no longer be just tough—it will be virtually impossible.

That's because a claim for full benefits under the new law requires that your computer be involved more than 50 percent of the time in a "qualified business use." If you do not meet the 50 percent test, you're entitled only to straight-line depreciation stretched out over 12 years. That's not much of a break if you've shelled out several thousand dollars for a system that may be worth only a fraction of its original cost in just a few years.

Keep in mind that the 50 percent test applies to equipment placed in service after June 18, 1984. If you purchased your system before then, you can breathe a little easier. But remember that any device you purchase after that date is subject to the new rules.

The 50 percent test is considerably more stringent than the "ordinary and necessary" and "production, collection or preservation of income" tests that once guided the IRS. In practice, only self-employed PC owners are likely to pass the new test. In better times, almost any "knowledge worker" could claim some connection between computer literacy and work responsibilities. Although the IRS may have disagreed in a given instance, the agency often had difficulty contradicting a taxpayer's position.

A claim for full benefits under the new law requires that your computer be involved more than 50 percent of the time in a 'qualified business use'.

Congress has clarified the matter for IRS auditors. The new law says that using your PC "in connection with the performance of services as an employee" does not count toward meeting the 50 percent test unless your employer requires that you buy a PC as a condition of employment. Generally, a company furnishes a personal computer if the job calls for a machine. Because it's a rare job description that mandates ownership of a personal computer, you're probably wise to scratch "employee use" as the rationale for a tax deduction.

Computer Convenience

You can't elude the 50 percent test by coaxing your boss into signing a letter on company stationery confirming that the personal computer is required for your job. Such an approach will do about as much good as a note from your mother. (Letters do have their place, however: to support a claim for the 12-year straight-line depreciation, you'll need to get written confirmation from your employer delineating "business use.")

The IRS can also fall back on another strict test, depending on the facts of your case, that seeks to determine whether your PC purchase was genuinely "required for the convenience of the employer." Just as compulsory PC ownership is a difficult claim to sustain, it's equally hard to imagine a situation in which an employee's PC purchase would meet this "employer convenience" standard.

The 50 percent test doesn't have many loopholes. The law forbids two owners from getting around the requirement by renting their PCs to each other. Also off-limits to the 50 percent rule are such "production of income" activities as managing investments in stocks, bonds, and real estate. This area of the new law is particularly tricky: investment management, for example, may qualify for either full or reduced benefits, should you legitimately meet the 50 percent test through another business activity.

Fortunately, there are situations in which the 50 percent test does not apply. If your computer is used as an integral part of—and is physically located in—a "regular business establishment," the test isn't applicable. The IRS usually construes "establishment" to mean an office or store that is part of your own business. It could also be a room in your house, if you meet certain "office-in-home" requirements. (But as you may have surmised, those requirements are very strict.)

Deducting Your PC

If you are eligible for full tax benefits according to the rules spelled out in "Brilliant Deduction," you can recover the cost of your PC in a variety of ways. Federal tax rules, which are briefly summarized here, contain numerous arcane exceptions—and some may apply to you. Also, state income tax laws often differ from federal rules. Your best bet is to rely on competent professional advice.

Depreciation

Since 1981 the IRS has relied on a greatly simplified means of figuring depreciation. That method is known as the Accelerated Cost Recovery System (ACRS), and it permits you to depreciate your PC over five years. Your deduction will be 15 percent of the system's cost in the year you placed it in service, 22 percent the next year, and 21 percent in each of the next three years. You can elect to depreciate your system at a lower rate or over a longer period, but it will probably not be advantageous to do so. Depending on how you handle your option for an investment credit, you may have to reduce the cost of the items you are depreciating.

The ACRS rules apply to hardware but usually not to software. Suppose, however, your dealer bundled your PC with *1-2-3* or *WordStar* as part of a special promotion. In that case, you can lump the software with the PC for depreciation purposes.

The IRS maintains that software priced separately is not eligible for ACRS depreciation. Not all tax experts—or tax courts—agree with this interpretation. Some say software should be treated the same as hardware; others say it should be deducted as a current-year expense.

Nevertheless, the IRS says you must amortize the software over its anticipated "useful life." This can be an advantage, since you can convincingly contend that much of the software on the market has a useful life of only two or three years. (Recall the number of *VisiCalc* users who switched to *1-2-3* after using the former only briefly.) But determining a "useful life" is a judgment call, so you cannot presume that the IRS will agree at audit time.

First-Year Write-Off

This is technically known as the Section 179 deduction. In lieu of claiming depreciation and an investment credit, you can deduct the cost of business-related property in the year you place the property in service. For 1984 this deduction was limited to $5000 for a joint or single return.

The limitation applies to your tax return as a whole, not merely to your computer system. For example, if you are married and filing a joint return, and your spouse buys a car for business use and elects to expense $5000 of the cost of the car, you cannot make the same election for an IBM PC you buy in the same year.

To the extent your PC is used for managing investments or for tax planning, it is not used in trade or a business and is therefore not eligible for the first-year write-off.

Minding Your Own Business

Suppose you use your PC a total of 200 hours this year. Of those, 120 hours are devoted to your own programming and consulting business; 20 hours to managing your investments; and 60 hours to other activities such as games and personal correspondence. Because 120 of the 200 hours qualify as business use, you've satisfied the 50 percent test. Now you can add in the 20 hours of investment use and take full tax benefits for the entire 140 hours (70 percent of the total use).

Although the 1984 act does not specifically mention software, it does give the IRS authority to add to the list of specific items covered by the new rules.

Now imagine instead that you've devoted only 90 of those 200 hours to your programming business. Your qualified business use is just 45 percent, and you're forced to use the 12-year straight-line method for depreciation. Once again you add in those same 20 hours of investment use, but because you did not pass the 50 percent test, they count only toward the 12-year straight-line depreciation instead of full tax benefits. In this case, you add those 20 hours to the 90 hours of business use and divide by 200. The resulting 55 percent is that portion of your original PC purchase that is eligible for 12-year straight-line depreciation.

If you must use the 12-year straight-line depreciation method, chances are that the resale value of your PC will be less than its remaining undepreciated cost. If you sell equipment at a loss, you may deduct the loss on the business portion of the item. Because this is a particularly complex area, you should consider seeking professional tax advice when you report this type of transaction.

The new law is unclear about whether or not using your computer to search for a new job within your field qualifies as a business use. Such activity did qualify under the old law. Although job hunting by definition isn't something an employer would require, it seems to me that job seeking is a qualified business use under the 50 percent test. The IRS may view it differently, of course.

Disposable Benefits

The Internal Revenue Code has long required that disposal of depreciable property within a certain period after the property has been placed in service be accompanied by "recaptured" tax benefits. That is, some or all of the tax gains realized by the property must be paid back during the year the taxpayer disposes of the equipment.

The new tax bill does not change the recapture provisions. The provisions do, however, cut more deeply because of the 50 percent business use test. Converting depreciable property from business use to personal use is regarded as a "disposition" for recapture purposes.

Suppose you buy a PC on December 1, 1984, and use it for a total of 50 hours that month—all for a qualified business use. On your 1984 return you elect to expense it, and in January you begin using the computer for personal purposes. You must recapture the portion of the 1984 deduction that corresponds to your personal use for 1985, and the recapture computation must be made on your 1985 tax return. Even without dissecting the computation here, it should be evident that you're in for trouble if your business use drops from 51 percent in 1984 to 49 percent in 1985. Also bear in mind that Congress has formally encouraged the IRS to "strictly enforce" the recapture provisions.

Although the 1984 act does not specifically mention software, it does give the IRS authority to add to the list of specific items covered by the new rules. A definitive IRS interpretation is pending. Until the word is handed down, you may assume that the rules outlined in "Can Your PC Survive a Tax Audit?" (*PCW*, Vol. 2, No. 6) still apply.

Record Time

In addition to limiting tax benefits, the 1984 act imposes much tougher record-keeping requirements than the law it supplants. Effective January 1, 1985, you must keep a record or log itemizing all business uses of your computer. Although the law does not specify a format for this record, the IRS plans to issue

detailed regulations. The mandatory log will probably resemble the one described in "Can Your PC Survive a Tax Audit?"

If you hire a CPA or another paid preparer to complete your tax return, you must sign a statement affirming that you're aware of the record-keeping requirements, that you understand them, and that you have indeed met them. The preparer will almost certainly insist on such a statement in order to avoid a $25 penalty.

The new law also penalizes the taxpayer for not adhering to these documentary requirements. Many taxpayers, of course, don't mind living dangerously. Traditionally, many people have claimed deductions that could not be proven, banking on the long odds of actually being audited. In the unlikely event that an audit occurred, the only "punishment" consisted of paying the additional tax plus interest. That scenario has changed with the new law, and the risk is now a bit higher for computer deductions. If an auditor finds that you failed to maintain the required records, you pay the tax, the interest, and a 5 percent negligence penalty.

No Free Lunch

Before the 1984 Tax Reform Act, self-employment income was the surest way to obtain tax benefits from a personal computer. With the recent changes in the law, self-employment is even more crucial. If you intend to buy a PC, now is the time to begin defining its niche in your business.

What business? you may ask. Although you may not feel comfortable in the role of businessperson, a host of extremely successful entrepreneurs would probably have said the same of themselves at some point. Assuming you have purchased and learned how to use a PC, you already have an excellent tool for starting a business. For extra income and for personal growth—and, of course, for some tangible tax advantages—you ought to give it your best shot.

Ralph Soucie, a former IRS auditor, is a CPA with the firm of Kenneth M. Mitchell & Company in Oregon City, Oregon.

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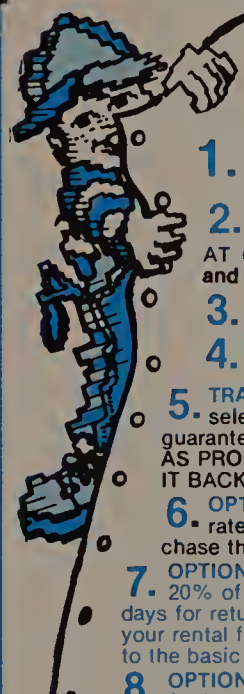

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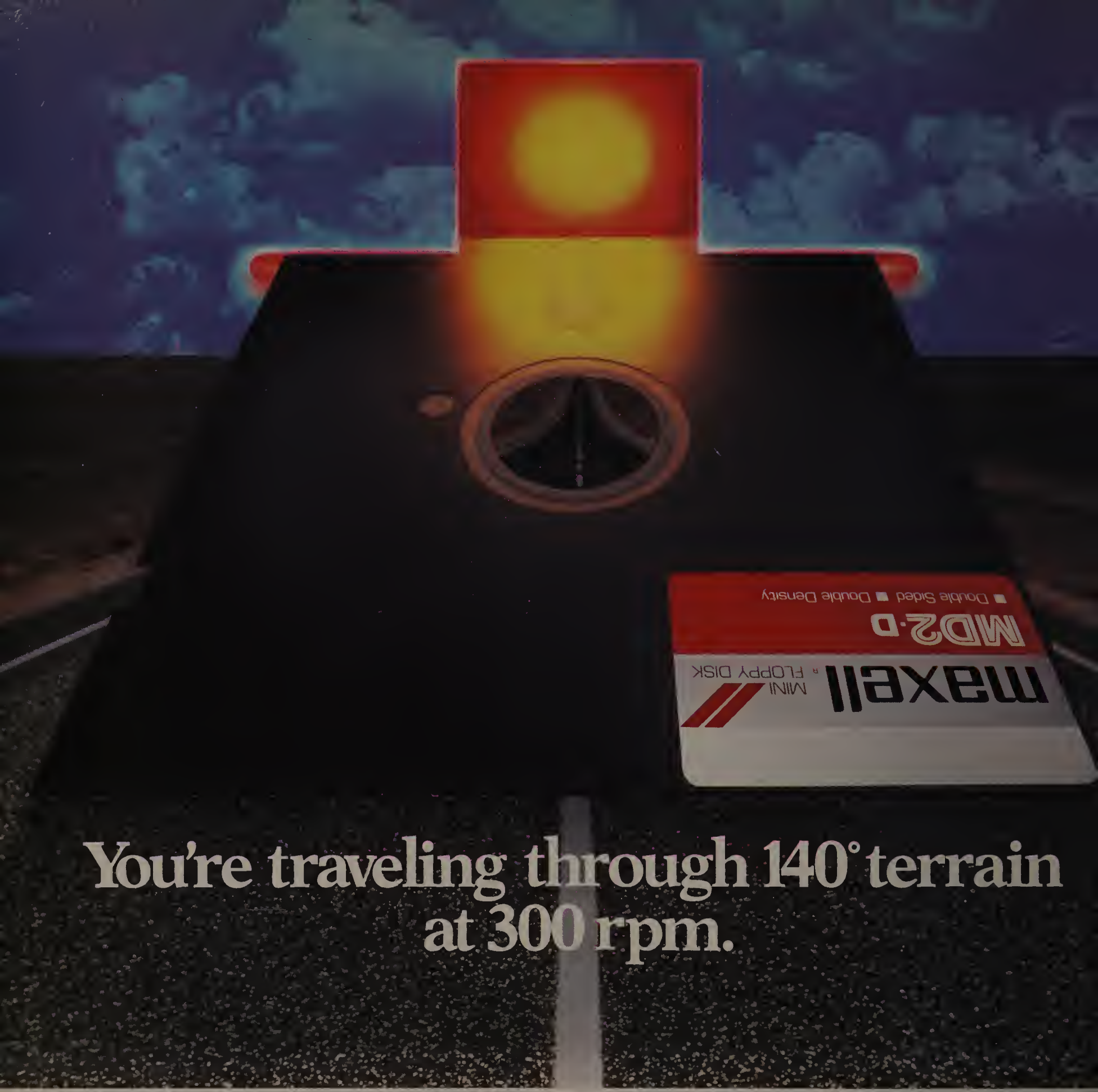

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Formulas for Profit

Cost-volume-profit (CVP) analysis helps manufacturers and other businesses monitor the bottom line and suggests swift action to beef up profit margins. A 1-2-3 template can make CVP a breeze.

Donald Hunt

To a gunfighter of the Old West, reaction time often meant life or death. To a professional baseball player, response time can make the difference between being a hero or a bum. And to today's business executive, quick action can ensure profit instead of loss—success rather than failure.

Business conditions change rapidly and affect virtually every aspect of the bottom line: price increases for materials, labor negotiations, commission schedules,

advertising trends, and pricing strategies. Not only must you stay on top of the changes you know about, you must also attempt to predict tomorrow's changes.

With a PC, a spreadsheet package, and a few key concepts, you can develop a powerful tool to help you fine-tune your reaction time and perhaps even improve your aim.

Eyeing the Bottom Line

For many years financial planners have used cost-volume-profit (CVP) analysis to determine the impact that changes in cost and volume have on their profits. What happens to the bottom line if material costs go up 5 percent and selling price goes down 2 percent? If your company sells multiple products and operates from several locations, analyzing the bottom-line impact of changes in cost or sales volume of a product can be difficult and time-consuming. When fixed overhead is high, a small change in sales volume can mean the difference between profit and loss.

CVP analysis is used to model the profit impact of changes in raw material or service costs, overhead expenses, and sales volume. Once you define and develop the CVP model, you can modify any cost or volume variable to reflect the profit impact of changes. Good or bad news comes quickly.

CVP analysis works with any type of business. It has been used primarily in manufacturing companies, where production or sales fluctuations can significantly affect the profitability of a product line, an individual plant, or the company as a whole. CVP analysis can also be used creatively in distribution, retail, service, and construction businesses.

A distribution company, for example, usually has high fixed costs for warehouse facilities, salaried personnel, and delivery equipment. Since those costs do not vary directly with sales volume, they do not conveniently disappear in a slow sales month. If the distributor relies on smart promotional planning such as discounts, purchasing incentives, and contests, additional volume can be generated in an otherwise slow month. CVP analysis can be used to gauge the profit impact of the increased volume and the increased costs resulting from scheduled promotions. Various combinations of advertising, price cuts, and other volume-boosting techniques can be modeled and compared.

CVP analysis is used to model the profit impact of changes in raw material or service costs, overhead expenses, and sales volume.

CVP analysis is also an effective budgeting tool. Rather than change the CVP variables to reflect day-to-day activity in the marketplace, you can manipulate variables to test profit-maximizing strategies or operating assumptions prior to formalizing plans and budgets. (For a detailed discussion of the theory behind CVP analysis, see "The Mechanics of CVP.")

You may already have used one facet of CVP analysis called break-even analysis. But since most companies strive to do more than break even, you'll need to take a broader view of CVP analysis as a means of achieving profit objectives. The method can be used by anyone with a pad, a pencil, and a calculator, but it takes time to recalculate the numbers each time variables change. A *1-2-3* spreadsheet equipped with keyboard macros can put CVP analysis to work for you.

The XYZ Story

To try your hand at building a *1-2-3* template for CVP analysis, use the hypothetical XYZ Company. XYZ manufactures sheet metal parts for aircraft, truck, and other large manufacturing companies. Because XYZ doesn't have products of its own, production volume is often difficult to predict. Both volume and profits vary substantially from month to month. Because XYZ has high fixed costs, a low-volume month can have a big impact on cash flow.

XYZ Company could use CVP analysis to help it make better decisions about what contracts to bid on and at what prices. In some months CVP analysis would help maximize profits, while in others it would help minimize losses.

The Mechanics of CVP

To develop a CVP model, you must identify all the costs of doing business. If you're a manufacturer, you must deal with raw materials, production labor, and plant overhead. Service businesses have to monitor labor and materials costs. Wholesalers and retailers need to factor in the costs of items bought for resale.
In addition to these product- or service-related costs, businesses incur expenses such as sales administration, office rent, printing, and product liability insurance.

Your next step is to classify each cost as being either fixed or variable. Fixed costs generally do not change directly in relation to sales or production volume. Few costs are totally fixed, but in a practical sense, many are almost fixed. Most general and administrative corporate expenses are fixed costs, at least in the short run. Office rent, for example, is fixed until you move or expand your facilities.

Variable costs change in direct relation to sales or production volume. Labor and raw materials costs should vary according to the number of units produced. Sales commissions expressed as a percentage of sales volume represent another variable cost. As sales or production volume rises or falls, so do variable costs.

Once costs have been classified as either fixed or variable, you can compute a "contribution" amount per unit of sales. Contribution is not necessarily the same as profit; it is the amount remaining when total variable costs are subtracted from total sales. Because variable costs such as sales commissions increase or decrease directly with sales or production volume, the contribution per dollar or unit of sales remains the same. Suppose, for example, that your company buys one style of rain umbrella for $4 apiece (a variable cost) and retails them for $12 apiece. The only other variable cost is the $3 sales commission paid to vendors who sell the umbrellas. To determine your contribution per umbrella, subtract the variable cost (product and commission) from the sales price to end up with a contribution of $5.

For each umbrella sold you will have $5 available to pay for the fixed expenses of running your business. But the $5 is contribution, not profit, because you have some large fixed costs to cover. If these fixed costs total $80,000 per year, divide that figure by 5; the company will break even at a sales volume of 16,000 umbrellas.

But there is more to the umbrella business than breaking even. How about a little profit? The marginal profit per unit after the company reaches break-even volume is equal to the contribution per unit. If the break-even figure is 16,000 umbrellas, and the company sells 20,000 umbrellas in 1984, multi-

ply the difference (4000) by the contribution ($5); the profit should be $20,000.

Any time you try to represent the real world as a model, you encounter problems. In CVP analysis not all costs are strictly fixed or strictly variable, and you may have to make some difficult decisions to classify a cost as being one or the other. You may even want to separate the individual costs into fixed and variable components.

Keep in mind the following observations: All planning depends to a certain degree on your ability to make assumptions about your business. Using CVP analysis involves making some assumptions about cost and volume. The real world is so complex that you may have to simplify things a little to make CVP analysis work for you. If you are careful, your assumptions and simplifications will not greatly affect the value of the information that CVP analysis provides.

The *1-2-3* template described here enables you to enter monthly manufacturing, sales, and overhead cost information easily. The input component of the template contains five sections (see Figure 1).

XYZ's industrial engineer has set normal capacity (line 7) for the plant at 7400 direct labor hours per month. Normal capacity is the production volume that XYZ should achieve in an average sales month. (It is neither the best nor the worst the firm can do.) This capacity assumes no changes in equipment or plant layout. It also assumes a single-shift operation. XYZ can produce in excess of normal capacity in peak months by working the first shift overtime or by bringing in a second shift. The template could easily be changed to reflect increased labor costs. Since virtually no costs are absolutely fixed, it's necessary to have a working concept of fixed costs that falls within a "relevant range" of sales or production volume. That range then becomes this model's normal capacity—the approximate volume at which certain costs are considered fixed. If actual volume changed significantly, these cost estimates would have to be revised.

The average amount paid for all direct labor (line 8) at XYZ is $5.55 per hour. This figure does not include fringe benefits, which are added to variable indirect manufacturing costs.

The fixed indirect manufacturing costs (line 9) include plant supervision, depreciation of building and equipment, and other production costs that do not vary with production volume. These are costs at normal capacity, and they total $55,000 per month.

The variable rate for indirect manufacturing costs (line 10) is computed for manufacturing costs that fluctuate. This rate includes plant electricity, fringe benefits for plant employees, and labor for handling material. It is expressed as a percentage of sales dollars. At XYZ, indirect manufacturing costs equal 8 percent of sales per month.

XYZ's sales expenses (line 12) encompass fixed and variable outlays. Fixed outlays include the sales manager's salary, advertising materials, and sales travel and entertainment. Fixed selling expenses are estimated at $10,000 (line 13). XYZ also hires manufacturers' representatives who pay their own expenses and are compensated by a 3½ percent commission (line 14).

For each product sold or expected to be sold, XYZ enters figures in several columns under the product sales forecast and cost data category (line 16). Sales units include the number of units sold or expected to be sold. Selling price is the average selling price per unit, which reflects sales made to different customers at different price levels. Direct labor (DL) hours/unit conveys the number of direct labor hours per unit calculated by XYZ's industrial engineer, assuming normal efficiency. Material/$ unit is the amount of material in dollars that each product unit requires. Standard prices and a normal scrap allowance are assumed.

```
A3: (T) '==================================================================
A4: (T) ' PROJECTION ASSUMPTIONS AND FACTORS
A5: (T) "_____________________________________________________________________
A6: (T) ' MANUFACTURING INFORMATION
A7: (T) '  Normal Capacity-Direct Labor Hours
F7: (T) 7400
A8: (T) '  Average Labor Rate Per Direct Labor Hour
F8: (T) 5.55
A9: (T) '  Indirect Manufacturing Costs-Fixed
F9: (T) 55000
A10: (T) '  Indirect Manufacturing Costs-Variable Rate
F10: (T) 0.08
A12: (T) ' SELLING EXPENSE INFORMATION
A13: (T) '  Fixed Expenses
E13: (T) 10000
A14: (T) '  Commission Rate Per Sales Dollar
E14: (T) 0.035
A16: (T) ' PRODUCT SALES FORECAST AND COST DATA
D17: (T) ^Sales
E17: (T) ^Selling
F17: (T) ^DL Hours
G17: (T) ^Materials
D18: (T) ^Units
E18: (T) ^Price
F18: (T) ^Unit
G18: (T) ^$ Unit
A19: (T) '  Product A
D19: (T) 2000
E19: (T) 26
F19: (T) 0.5
G19: (T) 12
A20: (T) '  Product B
D20: (T) 4000
E20: (T) 32
F20: (T) 0.6
G20: (T) 14
A21: (T) '  Product C
D21: (T) 3000
E21: (T) 38
F21: (T) 0.5
G21: (T) 18
A23: (T) ' GENERAL AND ADMINISTRATIVE EXPENSES INFORMATION
A24: (T) '  Fixed Expenses
E24: (T) 40000
A25: (T) '  Variable Rate Per Sales Dollar
E25: (T) 0.04
A27: (T) ' PROJECTION MODIFIER INFORMATION
A28: (T) '  Selling Price Modifier
D28: (T) 1
A29: (T) '  Labor Rate Modifier
D29: (T) 1
A30: (T) '  Material Cost Modifier
D30: (T) 1
A31: (T) '  Fixed IMC Modifier
D31: (T) 1
```

Listing 1: Cell-by-cell breakdown of CVC template

```
A32: (T) '  Variable IMC Modifier
D32: (T) 1
A33: (T) '==========================================================
A36: (T) ' COST-VOLUME-PROFIT ANALYSIS
A37: (T) '  Analysis Title:
C37: (T) 'Preliminary Forecast
A38: (T) '  For Month:
C38: (T) 'February 1984
E38: (T) ^Fixed
F38: (T) ^Variable
G38: (T) ^Total
A40: (T) ' Sales
G40: (F0) +D19*E19+D20*E20+D21*E21*D28
A42: (T) 'Manufacturing Costs:
A43: (T) '  Direct Material
F43: (F0) (+D19*G19+D20*G20+D21*G2)*(D30)
G43: (F0) +F43
A44: (T) '  Direct Labor
F44: (F0) (D19*F19+D20*F20+D21*F21)*F8*D29
G44: (F0) +F44
A45: (T) '  Indirect Manufacturing
E45: (F0) +F9*D31
F45: (F0) +G40*F10*D32
G45: (F0) @SUM(E45..F45)
E46: (T) "-------
F46: (T) "-------
G46: (T) "-------
A47: (T) '    Total Manufacturing Costs
E47: (F0) @SUM(E43..E45)
F47: (F0) @SUM(F43..F45)
G47: (F0) @SUM(G43..G45)
A49: (T) ' Selling Expenses
E49: (T) +E13
F49: (F0) +G40*E14
G49: (F0) @SUM(E49..F49)
A50: (T) ' General and Administrative
E50: (T) +E24
F50: (F0) +G40*E25
G50: (F0) @SUM(E50..F50)
E51: (T) "-------
F51: (T) "-------
G51: (T) "-------
A52: (T) '    Total Costs and Expenses
E52: (T) @SUM(E47..E50)
F52: (F0) @SUM(F47..F50)
G52: (F0) @SUM(G47..G50)
G53: (T) "------
A54: (T) ' Profit Before Income Taxes
G54: (F0) +G40-G52
G55: (T) "=======
A56: (T) '    Percent of sales
E56: (F2) +E52/G40
F56: (F2) +F52/G40
G56: (F2) +G54/G40
```

	A	B	C	D	E	F	G
1							
3	==========						
4	PROJECTION ASSUMPTIONS AND FACTORS						
5	----------						
6	MANUFACTURING INFORMATION						
7	Normal Capacity-Direct Labor Hours					7400	
8	Average Labor Rate Per Direct Labor Hour					5.55	
9	Indirect Manufacturing Costs-Fixed					55000	
10	Indirect Manufacturing Costs-Variable Rate					0.08	
11							
12	SELLING EXPENSE INFORMATION						
13	Fixed Expenses				10000		
14	Commission Rate Per Sales Dollar				0.035		
15							
16	PRODUCT SALES FORECAST AND COST DATA						
17				Sales	Selling	DL Hours/	Materials/
18				Units	Price	Unit	$ Unit
19	Product A			2000	26	0.5	12
20	Product B			4000	32	0.6	14
21	Product C			3000	38	0.5	18
22							
23	GENERAL AND ADMINISTRATIVE EXPENSES INFORMATION						
24	Fixed Expenses				40000		
25	Variable Rate Per Sales Dollar				0.04		
26							
27	PROJECTION MODIFIER INFORMATION						
28	Selling Price Modifier			1			
29	Labor Rate Modifier			1			
30	Material Cost Modifier			1			
31	Fixed IMC Modifier			1			
32	Variable IMC Modifier			1			
33	==========						
34							
35							
36	COST-VOLUME-PROFIT ANALYSIS						
37	Analysis Title: Preliminary Forecast						
38	For Month:	February 1984			Fixed	Variable	Total
39							
40	Sales						294000
41							
42	Manufacturing Costs:						
43	Direct Material					134000	134000
44	Direct Labor					27195	27195
45	Indirect Manufacturing				55000	23520	78520
46					---	---	---
47	Total Manufacturing Costs				55000	184715	239715
48							
49	Selling Expenses				10000	10290	20290
50	General and Administrative				40000	11760	51760
51					---	---	---
52	Total Costs and Expenses				105000	206765	311765
53							---
54	Profit Before Income Taxes						-17765
55							=======
56	Percent of Sales				0.36	0.70	-0.06
57							

Figure 1: This template for CVP analysis permits easy entry of monthly sales, manufacturing, and overhead cost data.

General and administrative expenses (line 23) have both fixed and variable cost elements. Fixed general and administrative expenses are those fixed costs not allotted to manufacturing or sales activities. At XYZ, those costs include executive and clerical salaries, office rent and expenses, and insurance. The fixed cost element is $40,000. The only variable general and administrative expenses at XYZ are for part-time clerical workers and temporary office help whose hours per month vary according to sales volume. The variable expense averages 4 percent of sales.

The projection modifier information section (beginning on line 27) shows the impact on profit made by certain percentage changes in various sales, cost, and expense categories. In this section a value of 1 lets you easily manipulate variables without changing a given formula, making data entry a snap. If a factor is less than 1, the normal amount will be reduced. If the factor is greater than 1, the normal amount will be increased. To see the profit impact of an overall 5 percent sales price increase, for example, you would enter 1.05 in the selling price modifier (line 28). Costs that do not have a modifier can be changed directly at their cell locations.

Setting Up a CVP Template

Now that you know the basic structure of XYZ, you can set up the *1-2-3* template and several quick keyboard macros that make the template easy to use.

Start by entering the top portion of the spreadsheet format shown in Figure 1 (Projection Assumptions and Factors). If you have any problems building the template, you can refer to the complete cell-by-cell description of the template as shown in Listing 1. The range of cells from F40 to G54 should be formatted to display only integers with the command */Range Format Fixed* **0 <Enter> F40..G54 <Enter>**. Enter the same numbers shown so you can check your results with the figures shown in the next section of the template, Cost-Volume-Profit Analysis. Later you can build keyboard macros and easily change the variables.

The lower portion of the template displays the results of the CVP calculations. After you have completed this portion of the template, your calculated amounts should match the results shown.

Data Input Macros

Listing 2 shows three input macros for use with the CVP template. Although you don't have to use keyboard macros, they facilitate data entry (see "/X Marks the Macro," *PCW*, Vol. 2, No. 3). Macros automatically move the cell pointer to various input cells and eliminate time-consuming manual keying.

The input macros are named ranges. The sales forecast input macro is named \A; when you press <Alt>-A, the cell pointer automatically moves to the proper cells for entering the sales forecast information. The title input macro (<Alt>-B) moves the cell pointer so you can enter the template title, date, and period covered by the model. You can change the projection modifiers by using the modifier input macro (<Alt>-C).

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```
Sales Forecast Input Macro   Alt A
         /WGRM{GOTO}A16~
         {GOTO}D19~{?}{RIGHT}{?}{RIGHT}{?}{RIGHT}{?}~
         {GOTO}D20~{?}{RIGHT}{?}{RIGHT}{?}{RIGHT}{?}~
         {GOTO}D21~{?}{RIGHT}{?}{RIGHT}{?}{RIGHT}{?}~
         /WGRA
         {GOTO}A37~

Title Input Macro   Alt B
     {GOTO}A36~{GOTO}C37~{?}{GOTO}H37~{?}{GOTO}C38~{?}{HOME}

Modifier Input Macro  Alt C
     {GOTO}A27~{GOTO}D28~{?}{DOWN}{?}{DOWN}{?}{DOWN}{?}{DOWN}{?}{HOME}
```

Listing 2: Input macros

Template in Action

You can use the CVP template to analyze each month's anticipated production volume. First analyze the anticipated contract sales by product; then enter the volume, cost, and sales price. You can do this on a preliminary basis at least one month in advance to determine how much capacity will be used based on the number of contracts already sold. If the anticipated volume is low, you'll know that a sales push is in order.

As potential new contracts are identified, you can use the template to evaluate various alternative bid prices and estimate an overall profit or loss position. The closer you get to the actual month, the more competitive your pricing will be. If a month looks bad, you can try to generate enough production to cover variable costs and make some contribution to the fixed costs to minimize loss.

You can also use the template to analyze the profit impact of real or anticipated changes in the marketplace. For example, if labor costs increase 5 percent due to a scheduled union contract raise, how much will profits be eroded? By entering a labor rate modifier of 1.05, you can quickly determine the profit impact of the labor increase. If a 3 percent increase in raw material costs was not anticipated during bidding, you can calculate the profit impact of having to absorb the total increase by entering a material cost modifier of 1.03. And if spending $10,000 per month on new equipment would yield a 5 percent labor cost improvement, you can determine whether an increase in profits will result. Simply enter the fixed cost increase and a labor rate modifier of .95 to obtain your answer.

You can use the template to pose a variety of questions. If the company hires an industrial engineer at $2500 per month and cuts labor costs by 5 percent, what is the effect on profit? Does it make sense to accept a contract below the usual margins if the resulting production level exceeds normal capacity? How much of a loss will be sustained in a month of very low volume? (For demonstration purposes, assume a layoff of some plant supervision personnel at a $10,000 savings in fixed costs and a 2 percent increase in variable manufacturing costs.)

Once you have mastered basic CVP concepts, you can easily augment the template. By adding some *1-2-3* data table functions, you can automatically test numerous other "what if" assumptions. Using the *1-2-3* graph functions, you can build an *X-Y* graph of your company's CVP curves. The number of questions that a CVP template can answer is virtually infinite. You'll gain a significant amount of information from a small investment in time.

Donald Hunt is a CPA and a data processing consultant in Atlanta, Georgia.

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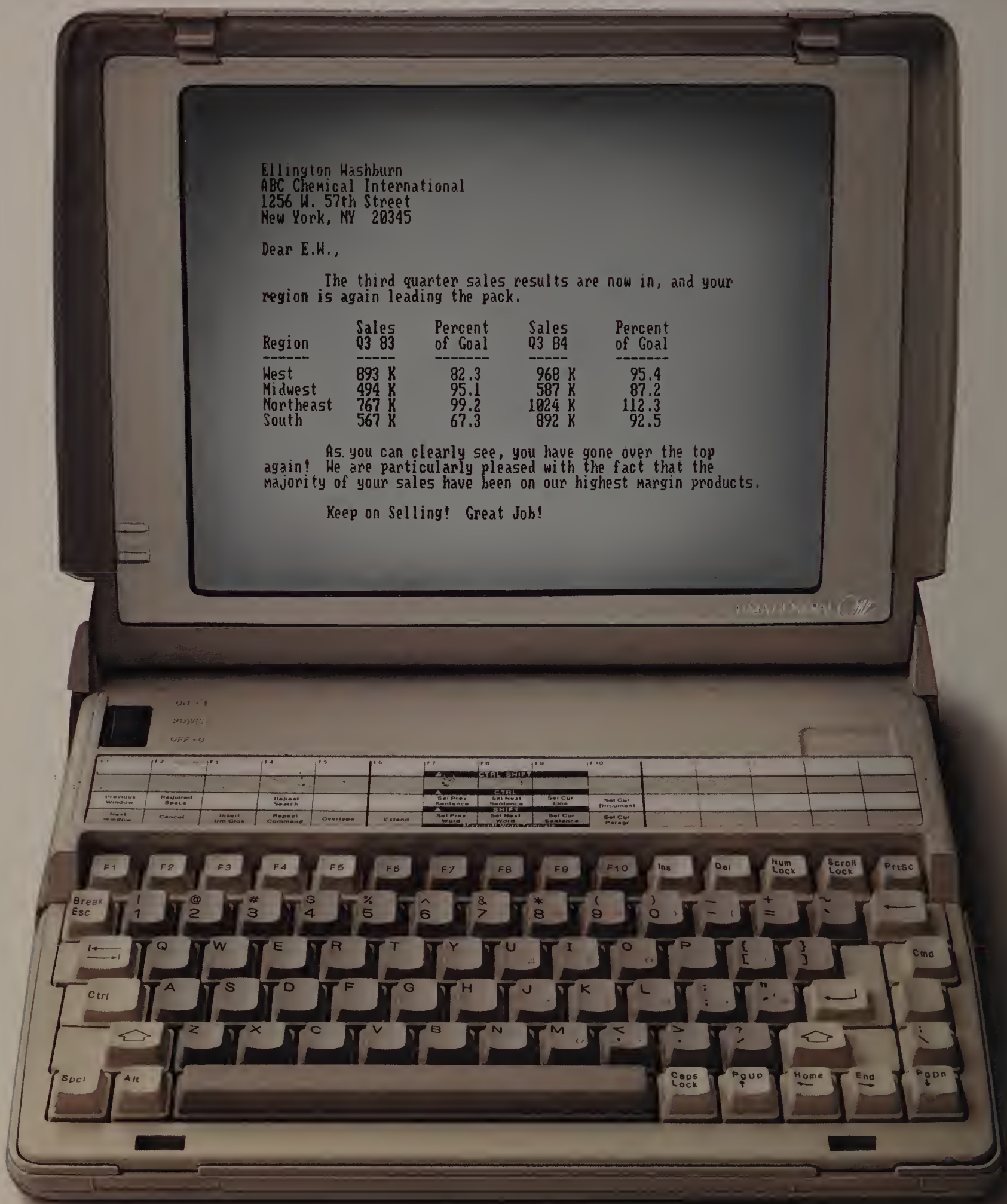

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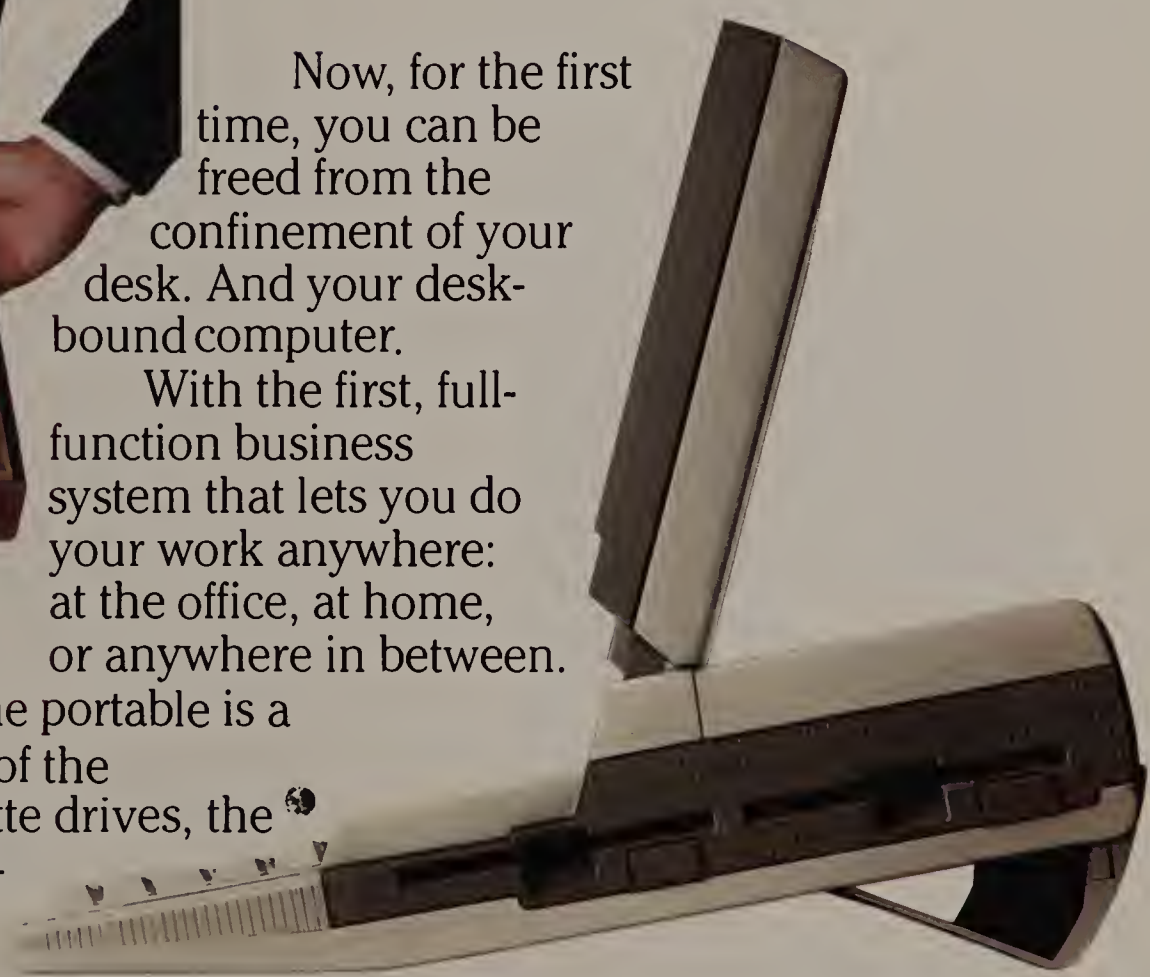

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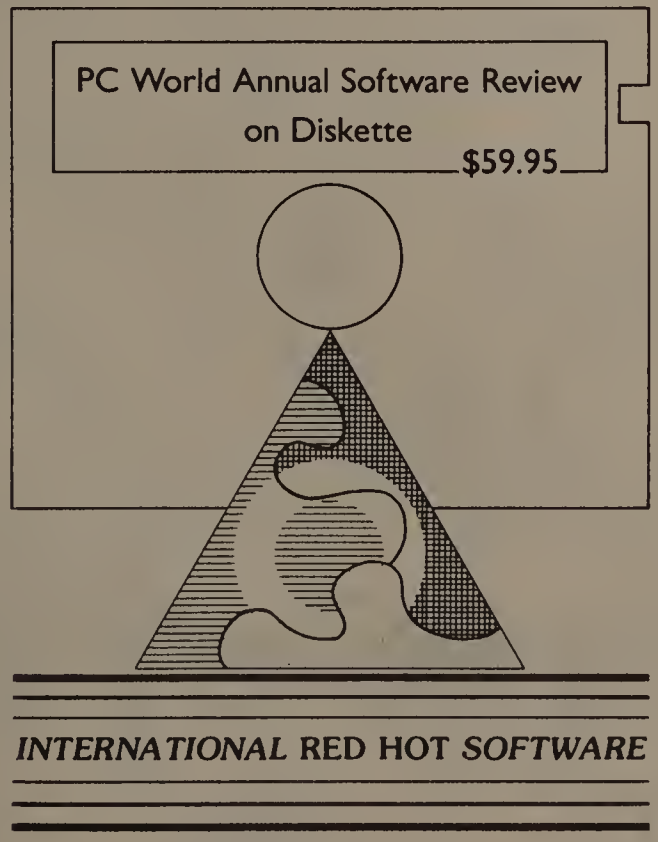

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Featured this month: pretty printing with 1-2-3, a pfs:write tip, fast DOS 2.00 key redefinition, utilizing a VCR as an RF modulator, and a better random number generator

Edited by Steven Cook

Worksheet Printer Controls

I once wished for an easy way to put print attributes into *1-2-3* worksheets. The only method I knew for creating boldface print or underlining parts of a worksheet was to repeatedly use the *Range* and *Setup* string commands, but I would not call that easy. Recently I developed a technique that I have been using quite successfully: placing printer codes directly in worksheets.

To do this I first create some files that contain the control codes required by the printer to activate the various print enchancements. Each file contains the characters needed to activate one enhancement, and the files' names all end with the .PRN extension. I keep these .PRN files on my *1-2-3* system disk to allow selection of italic fonts, boldface, underlining, form feeds, and condensed print.

The trick is to read the desired file into a worksheet cell using *1-2-3*'s */File Import Text* command. You will generally see some funny-looking characters on the screen, but you can ignore them; they are the IBM extended character-set representations for the print enhancement codes contained in the cell. If required, additional text can then be added to the cell using *1-2-3*'s edit mode. When *1-2-3* prints the cell, the printer switches to the desired mode until another printer control code is received.

You can use BASIC or the EDLIN program on the DOS disk to create .PRN files with the proper codes for your printer. (You can also use DEBUG, if you know how.) Just make sure that you do not accidentally put a carriage return and linefeed into the files when you create them, or you will have extra lines on your printouts.

Check your printer manual for the proper control codes to activate the various print enhancements and fonts your printer is capable of producing. You may also need codes to turn them off. If you have a keyboard enhancer such as *ProKey*, you can make the process of importing the enhancements into your worksheets completely painless.

Another way I enhance the printing of a *1-2-3* worksheet is by putting the printer control codes used by *WordStar*, my word processing program, into the worksheet, printing the worksheet to disk as a .PRN file, and then using the word processing program to send the .PRN file to the printer. For added power I set the worksheet's left margin at zero and put *WordStar* dot commands in the first column. For example, using a *WordStar* dot command, I can control page breaks, something that is not easy to do using the print facilities of *1-2-3*. Most popular word processing programs can be used to take advantage of these techniques.

Bill Castner
Bethesda, Maryland

Legendary Graphs

Here is an easy way to put floating legends virtually anywhere on a *1-2-3* graph. The trick is to create them as labels for an "invisible" data range—one that will not appear on the screen.

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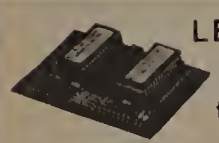

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First set up a data range composed of blank cells. Enter the vertical coordinates of your text in the appropriate cell and leave the other cells blank. Choose a second blank range and enter the desired legend text in the corresponding cell.

For example, if a graph has 12 numbers in its *X* range, and you want to place text over the third number (at vertical coordinate 600), create a range of 12 cells, all blank except for '600' in the third cell. Create another range of 12 blank cells with the text of the legend in the third cell. Assign the two ranges as Data and Data Labels, respectively, and use the */Format Neither* command to suppress the data range so that only the text will appear.

This technique is very flexible because there is no restriction on the length of the text (except for the size of the graph itself), and any number of leading spaces can be used to refine its position.

Everette Gardner, Jr.
Boiling Springs, Pennsylvania

Editor's note: Kent Murray pointed out this technique in last month's Letters. *This contribution from Everette Gardner explains how it is done.*

pfs:write With DOS 2.00

As a user of *pfs:write* I was quite disappointed to see that the manual warned against placing DOS 2.00 on the *pfs:write* system disk. The program works with DOS 2.00; it's just that you can't put DOS 2.00 on the disk to start the program automatically. The people at Software Publishing Corporation told me that the problem is due to insufficient disk space. As purchased, the *pfs:write* disk has 31,583 bytes free, and DOS 2.00 requires about 39,700 bytes.

I reviewed the disk directory and found a file named LOGO.EXE, which does nothing more than display a very nice pfs logo on the screen. By erasing the LOGO.EXE file I was able to create room for DOS 2.00. I also removed the reference to LOGO.EXE from the AUTOEXEC.BAT file so that the *pfs:write* program starts immediately.

Daniel Domzalski
Buffalo Grove, Illinois

Editor's note: It's a good idea to copy the LOGO.EXE program onto another disk before you delete it.

DOS Tips

I've discovered a few things about DOS 2.00 and 2.10 that I would like to pass along to other readers.

First there is a bug in the redirection feature that occurs when you use the append option, as with the command **DIR ≫ DIRLIST**. The problem is that EDLIN places an end-of-file marker (EOF) at the end of its

files, and the redirection feature appends data *after* the EOF mark. Since the TYPE command and some programs cannot read past the EOF, the appended data appears to be missing. You can display the contents of the file by using the COPY command with the /B option (**COPY DIRLIST CON:/B**), but otherwise you might wonder what happened to the data.

Another fact many users apparently do not know is that the EDLIN program on the DOS disk provides a very easy way to put control characters into a file. The trick is to type **< Ctrl >-V** first, then type the capital letter corresponding to the control character you want. For example, **< Ctrl >-V X** puts a *Control X* into the file. This is a great way to create escape sequences that select the various screen control functions provided by the ANSI.SYS device driver [see "Custom Prompts," *.*, *PCW*, Vol. 2, No. 2]. It's discussed in the DOS manual under "Information Common to All EDLIN Commands." To enter the Escape character (ASCII 27), type **< Ctrl >-V** and then a left square bracket ([).

The third tip is that the ECHO command can be used to send escape sequences to ANSI.SYS and, with the redirection feature, to the printer. For example, the command **ECHO ^[@ > PRN** sends Escape-@ to the printer. (The two characters ^[are the characters displayed on the screen when you type **< Ctrl >-V [** in EDLIN.) The only problem with this method is that there is no way to prevent the ECHO command from also sending a carriage return and linefeed after the escape sequence.

Bob Stephan
Monterey, California

Editor's note: The ECHO command works better than the PROMPT command for invoking the functions of the ANSI.SYS driver because ECHO will send characters to the screen even when an ECHO OFF command is in effect.

Another DOS Secret

AVAILDEV is another undocumented DOS 2.*xx* configuration command that can be placed in a CONFIG.SYS file. The AVAILDEV configuration command specifies whether or not the characters \dev\ must precede the names of devices. When AVAILDEV is set to "true" (or not set at all, since "true" is the default condition), a device can be referenced by just its name—for example, CON:, COM1:, PRN:—or by its name preceded by \dev\ as used in the XENIX operating system. When the configuration is set to "false" by the presence of the line 'AVAILDEV=FALSE' in the CONFIG.SYS file of the system disk, a device can be referenced only by the XENIX-like name.

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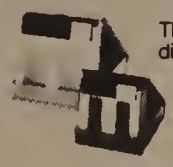
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This setting allows files and directories to have the same names as devices: for example, PRN, CON, and COM1.

Robert Raymond
Provo, Utah

Editor's note: As always, readers are advised to use caution when experimenting with undocumented commands and features. It's best to avoid them if you do not feel qualified to recover from any problems they may create.

Key Reassignments With DEBUG

Readers without the Macro Assembler can enjoy the benefits of Larry Axsom's key redefinition program ["ANSI.SYS Key Reassignment," *.*, *PCW*, Vol. 2, No. 6] by using the DOS 2.*xx* version of DEBUG to assemble the necessary statements.

KEYDEFS shows the screen output as you use this technique to create the file MYKEYS.COM, which redefines keys <F1> through <F10>, <Alt>-1, and <Alt>-0. You can create a file to implement your own set of key definitions by entering the four assembly statements followed by as many lines of characters as are needed for your function key definitions. After the definitions are entered, add the line **DB '$'**, which adds a dollar sign, used by DOS to mark the end of text to be output.

When you have typed this line, press the <Enter> key twice to get the hyphen prompt. Use the Unassemble and Dump commands to verify that you have entered the assembly language statements and key definitions correctly. After the lines have been entered correctly, use the Name command to assign a file name ending with the .COM extension.

Use the command **R CX** to display the contents of register CX and enter the length of the program in response to the colon prompt. The program's length is the offset value that appears on the line below the '$' entry, minus 100 hexadecimal. In KEYDEFS the value is 01D1, so MYKEYS .COM is 00D1 bytes long. The W command writes the newly entered program on the disk with the name you selected earlier, stating the number of bytes being written.

The Quit command returns control to DOS. You can use the Quit command any time you have the hyphen prompt, but everything you have entered will be lost unless you first use the Write command to store it on disk. The Quit command is a good way to stop everything and start over if you have made mistakes. The DOS manual explains more about how to use DEBUG.

Michael J. Grabel
Windsor, Connecticut

Editor's note: This is perhaps the fastest way to implement new key definitions. You may want to create several such .COM files to define various keys as needed.

```
A>DEBUG <Enter>
-A 100 <Enter>
xxxx:0100 MOV  AH,9 <Enter>
xxxx:0102 MOV  DX,109 <Enter>
xxxx:0105 INT  21 <Enter>
xxxx:0107 INT  20 <Enter>
xxxx:0109 DB 1B'[0;59;"DIR "p' <Enter>
xxxx:0117 DB 1B'[0;60;"DIR /W"p' <Enter>
xxxx:0127 DB 1B'[0;61;"*."p' <Enter>
xxxx:0133 DB 1B'[0;62;".* ";13p' <Enter>
xxxx:0143 DB 1B'[0;63;"COPY "p' <Enter>
xxxx:0152 DB 1B'[0;64;"ERASE "p' <Enter>
xxxx:0162 DB 1B'[0;65;"EAZE ";13p' <Enter>
xxxx:0174 DB 1B'[0;66;"BASIC ";13p' <Enter>
xxxx:0187 DB 1B'[0;67;"MORE <"p' <Enter>
xxxx:0197 DB 1B'[0;68;"EDIT "p' <Enter>
xxxx:01A6 DB 1B'[0;120;"MYKEYS ";13p' <Enter>
xxxx:01BB DB 1B'[0;129;"NOKEYS ";13p' <Enter>
xxxx:01D0 DB '$' <Enter>
xxxx:01D1 <Enter>
-U 100 108 <Enter>
xxxx:0100 B409          MOV     AH,09
xxxx:0102 BA0901        MOV     DX,0109
xxxx:0105 CD21          INT     21
xxxx:0107 CD20          INT     20
-D 109 1D0 <Enter>
xxxx:0109  1B 5B 30 3B 35 39 3B                                  .[0;59;
xxxx:0110  22 44 49 52 20 22 70 1B-5B 30 3B 36 30 3B 22 44   "DIR "p.[0;60;"D
xxxx:0120  49 52 20 2F 57 22 70 1B-5B 30 3B 36 31 3B 22 2A   IR /W"p.[0;61;"*
xxxx:0130  2E 22 70 1B 5B 30 3B 36-32 3B 22 2E 2A 20 22 3B   ."p.[0;62;".* ";
xxxx:0140  31 33 70 1B 5B 30 3B 36-33 3B 22 43 4F 50 59 20   13p.[0;63;*"COPY
xxxx:0150  22 70 1B 5B 30 3B 36 34-3B 22 45 52 41 53 45 20   "p.[0;64;"ERASE
xxxx:0160  22 70 1B 5B 30 3B 36 35-3B 22 45 41 5A 45 20 22   "p.[0;65;"EAZE "
xxxx:0170  3B 31 33 70 1B 5B 30 3B-36 36 3B 22 42 41 53 49   ;13p.[0;66;"BASI
xxxx:0180  43 20 22 3B 31 33 70 1B-5B 30 3B 36 37 3B 22 40   C ";13p.[0;67;"M
xxxx:0190  4F 52 45 20 3C 22 70 1B-5B 30 3B 36 38 3B 22 45   ORE <"p.[0;68;"E
xxxx:01A0  44 49 54 20 22 70 1B 5B-30 3B 31 32 30 3B 22 4D   DIT "p.[0;120;"M
xxxx:01B0  59 4B 45 59 53 20 22 3B-31 33 70 1B 5B 30 3B 31   YKEYS ";13p.[0;1
xxxx:01C0  32 39 3B 22 4E 4F 4B 45-59 53 20 22 3B 31 33 70   29;"NOKEYS ";13p
xxxx:01D0  24                                                $
-N MYKEYS.COM <Enter>
-R BX <Enter>
BX 0000
:0 <Enter>
-R CX <Enter>
CX 0000
:D1 <Enter>
-W <Enter>
Writing 00D1 bytes
-Q <Enter>
A>
```

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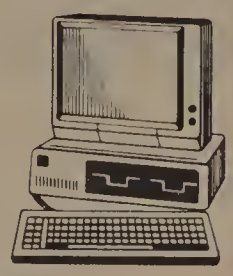

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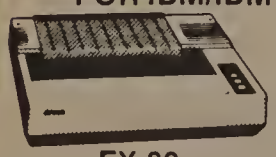

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```
10 INPUT "Number of bits";BITS
20 INPUT "Seeds";A,B
30 MAX=2^BITS-1
40 A=2*A:B=2*B
50 IF A>MAX THEN A=A-MAX
60 IF B>MAX THEN B=B-MAX
70 C=A+B:IF C>MAX THEN C=C-(MAX+1)
80 C=2*C:IF C>MAX THEN C=C-MAX
90 PRINT C
100 A=B:B=C
110 GOTO 70
```

RANDOM.BAS

VCR as RF Modulator

The color graphics adapter on the IBM PC and on the Compaq has a small, round RCA connector for composite video monitors, but it cannot be connected to an ordinary television set without the aid of an RF modulator. If you own a video tape recorder, you can use it in place of an RF modulator. Connect an inexpensive dubbing cable with the computer's composite video output and the VCR "camera" input and flip the switch on the VCR from "tuner" to "camera."

Phil Howitt
Los Angeles, California

Editor's note: You can also use the VCR to record computer output. In my experiments the signals from the color graphics adapter were not strong enough for the recorder, and while the result was very clear, the recording played back in black and white.

Truly Random

I have developed a random number generating algorithm that avoids some of the drawbacks of other methods and appears to be somewhat faster. One of the major faults of random numbers is that they have a finite "string length" (the number of "random" numbers that are produced from a given seed value before the sequence begins to repeat). The technique presented here also has a fixed string length, but it is much larger than that of its predecessors.

Current algorithms use the "congruence" method to produce random numbers, a technique that is highly dependent upon the seed value. Certain seeds will cause congruence algorithms to generate short, nonuniform, or infinitely looped sequences. The technique shown in RANDOM.BAS does not possess this flaw to any great measure, and its string lengths are only slightly dependent on the initial seeds.

Dr. Wilson Talley and I developed the technique based on a concept first suggested by Dr. Nicholas Metropolis of Los Alamos. It involves shifting the bits of a number and adding the two

previous terms to form a new term. Bit shifting ensures that successive terms will have very little correlation with each other. The end of a string is reached when two consecutive numbers are produced that are identical to the first two produced. As expected, the length of the string increases as more bits are used, but the rate of growth is unprecedented. Presently no limit has been found for 16-bit strings after 30 hours of running on an IBM PC.

This random number generator has been tested for average, variance, frequency, runs up and down, cycle breaking, seed dependence, chi-square, D-square, and cycle length up to 12 bits. No preferred pairs or preference for parity or primes has been observed. Serial, gap, maximin, and minimax tests are planned, and interested parties are invited to contact me for those results.

Gary Andrew
Davis, California

Editor's note: Readers can write to Mr. Andrew at 311 E. 7th St. #9, Davis, CA 95616.

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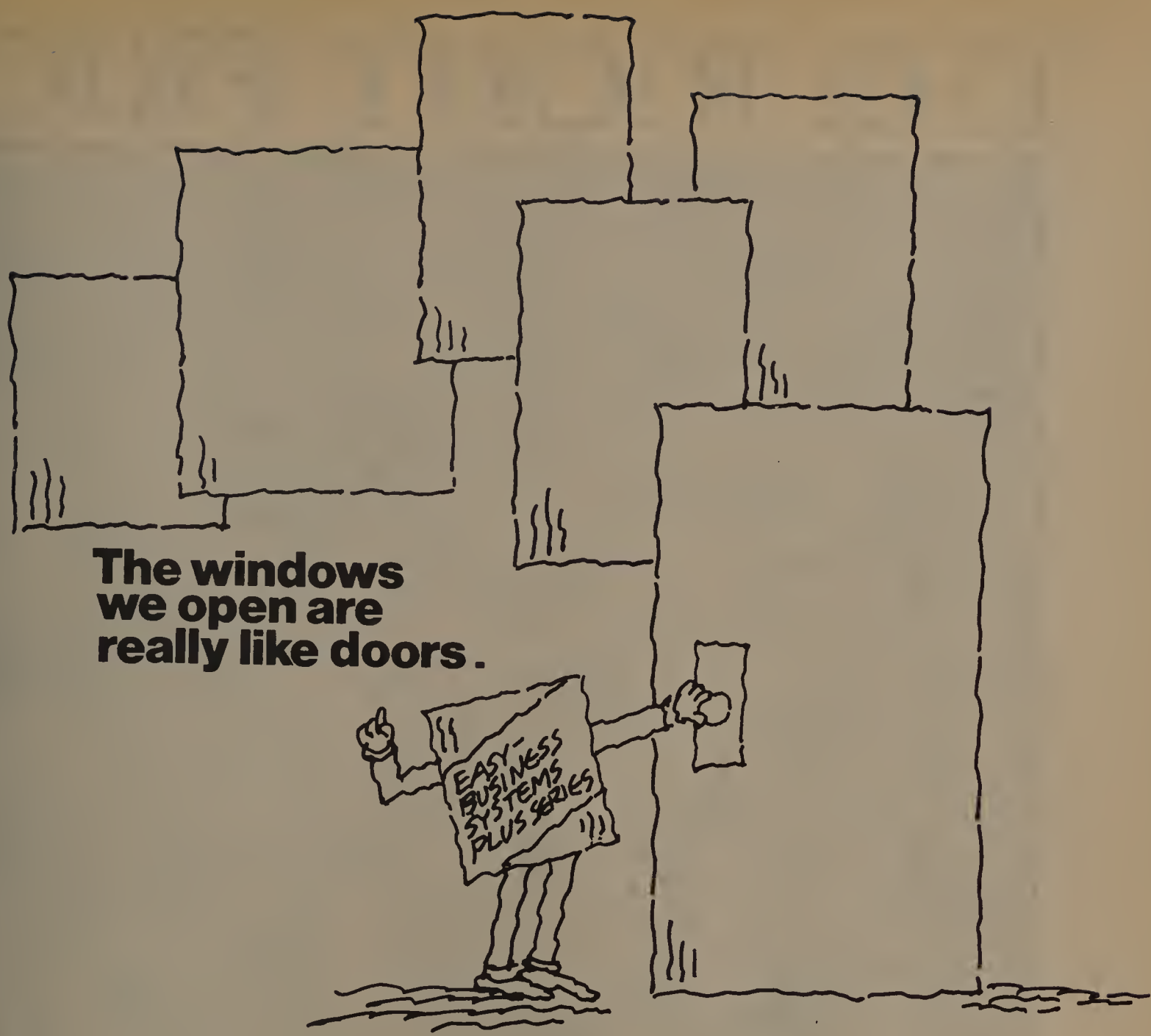

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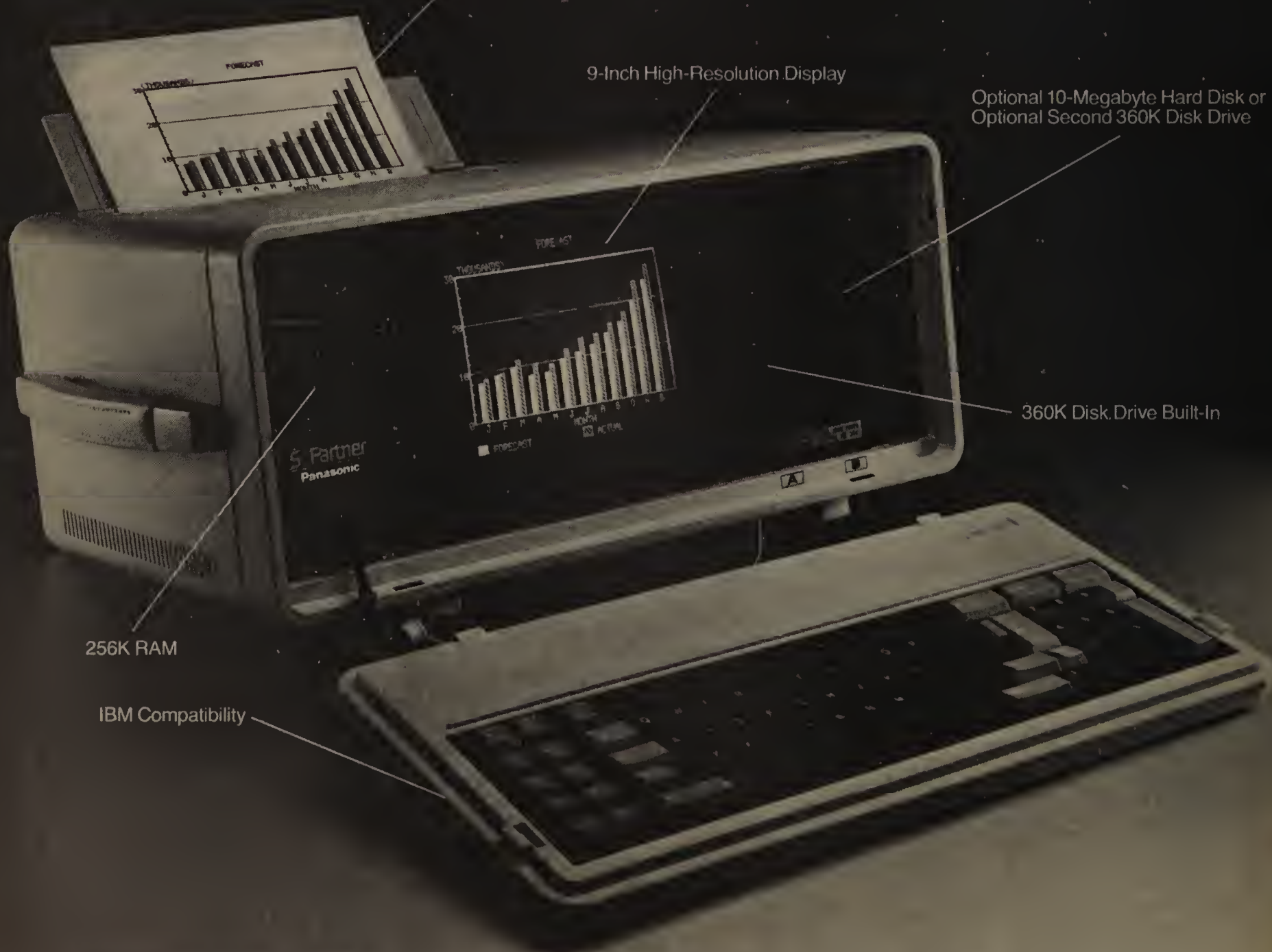

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Circle 694 on reader service card

Just Announced

An array of new PC products

Featured this month: two new compatibles, 2MB of memory on a single board, speech recognition, a portfolio management template, and business graphics and free-form painting programs

Edited by Seth Novogrodsky

In the fast-paced personal computer marketplace, *Just Announced* keeps you informed of the latest developments in IBM PC and compatible technology. Information for this department is provided by manufacturers; these write-ups are not reviews. *Just Announced* does not evaluate or corroborate manufacturers' claims. Many of these descriptions will be followed up by reviews in future issues.

Hardware

Boards

2megaboard
A memory expansion board that provides from 64K to 2MB (2048K) of RAM with full parity checking, 2megaboard accommodates 64K or 256K RAM chips or a combination of the two. Up to eight boards can be installed in an expansion unit for 16MB of memory. 2megaboard comes with MegaCache and MegaSpool software. MegaCache speeds PC performance by creating a "cache" in RAM to store the most recently read data. Unlike a RAM disk, MegaCache automatically updates the disk with any changes to the cache. MegaSpool directs data to the cache and then to a selected output device, such as a printer. An optional multifunction I/O module will be available for the board. List price: without RAM $295, 64K $395.
Datatron, Inc.
2942 Dow Ave.
Tustin, CA 92680
714/544-9970

DASH-16
A data acquisition board for laboratory and industrial applications, DASH-16 transfers data from a measuring device to a PC at speeds of up to 40,000 samples per second, using direct memory access. The board is switch-selectable for 16 single-ended channels or 8 differential analog input channels, and an instrumentation amplifier is provided. DASH-16 also includes two 12-bit multiplying digital/analog converters and utility software for operating all board functions. List price: $895.
MetraByte Corp.
254 Tosca Dr.
Stoughton, MA 02072
617/344-1990

VocaLink Speech Recognition Board (SRB)
The VocaLink SRB allows PC users to operate off-the-shelf software with up to 240 spoken commands. The SRB has two operating modes. Keystroke Simulation, which works with standard PC software, substitutes user-defined spoken commands for keyboard entries. PC mode uses the custom software provided to take advantage of the full range of VocaLink capabilities. The board contains an 80186 microprocessor, Interstate's ASA-16 audio spectrum analysis chip, 128K of RAM, and 32K of EPROM. VocaLink works with the manufacturer's voice synthesizer (PC mode only), standard headset microphone, headset microphone with earphone, and desktop microphone. List price: $1650.
Interstate Voice Products
1849 W. Sequoia Ave.
Orange, CA 92668
714/937-9010

Vutek-CPS
A multifunction display board for the PC, Vutek-CPS features color graphics, a parallel port, and a serial port. The board is compatible with *1-2-3* and Microsoft's *Word* and *Flight Simulator.* Vutek-CPS provides composite video output, direct RGB output, and output for an RF modulator used with a television set. The parallel port can be configured as LPT1, LPT2, or LPT3, and the serial port can be configured as COM1 or COM2. List price: $449.95.
Vutek Systems, Inc.
Marketing Dept.
P.O. Box 23032
San Diego, CA 92123
619/789-8360

Computers

APC (Advanced Personal Computer) III
Priced at less than $2000, the APC III is advertised as having faster processing and higher-resolution graphics than the IBM PC, but it lacks the ability to run programs that make direct calls to the hardware. The APC is promoted as a UNIX development tool that works with the 8086 chip, a speedier chip than the PC's 8088. Although the APC can operate nearly 100 PC-DOS programs, most PC software requires modification to run on this computer. The basic machine includes 128K RAM (upgradable to 640K), MS-DOS 2.11, one 5¼-inch floppy disk drive, an NEC 7220 graphics processor and dedicated graphics memory, a detachable keyboard with 12 function keys and separate cursor keys, and a 12-inch monochrome monitor. A 10MB hard disk is required to run UNIX System III. A color monitor, a second floppy disk drive, a 20MB hard disk, and a memory management board for UNIX applications are optional. List price: $1995, with 10MB hard disk $3995.
NEC Information Systems
1414 Massachusetts Ave.
Boxborough, MA 01719
617/264-8000

Otrona 2001
The 19-pound Otrona 2001 is billed as a "convertible" personal computer, rather than a "luggable" or a "desktop." By replacing

Otrona 2001, Otrona Advanced Systems

the unit's 80-column, 7-inch flat screen with an optional 12-inch monochrome or a 13-inch RGB display, you can switch the 2001 from mobile to stationary mode. When configured as a portable, the 2001 displays amber characters that are crisp but roughly half the size of the PC's. The manufacturer promises compatibility in six major areas: operating system, media, ROM, architecture, display, and keyboard.

The 2001 comes with an 8088 microprocessor, an 8087 socket, 128K RAM expandable to 640K, a single 5¼-inch floppy disk drive, a 7-inch monitor, a detachable keyboard that departs slightly from the PC's, one serial port, and two parallel ports. Options include MS-DOS 2.00, GW BASIC, a second floppy disk drive, an internal 10MB hard disk, a Z80B coprocessor and CP/M, two additional serial ports, an expansion chassis with three slots, an internal 1200/300-bps modem, and a battery pack. The 2001 accepts either AC or DC power. List price: $2495.
Otrona Advanced Systems Corp.
4725 Walnut St.
Boulder, CO 80301
800/525-7550, 303/444-8100

Monitors

DT-H103
A high-resolution, high-contrast, 16-color RGB monitor, the 10-inch DT-H103 features 640 horizontal by 480 vertical pixels and displays up to 25 lines of 80 characters each. A swivel stand is included. List price: $753.
Panasonic Industrial Co.
1 Panasonic Way
Secaucus, NJ 07094
201/348-7183, 201/392-4322

DT-H103 Color Monitor, Panasonic

Printers

Amdek 5055

A 55-character-per-second, letter quality daisy wheel printer with a 2K buffer, the Amdek 5055 prints

Amdek 5055 Printer, Amdek

in both directions with adjustable character spacing of 10, 12, or 15 characters per inch. The printer uses a double daisy wheel that accommodates up to 125 characters, handles paper up to 16 inches wide, uses a cassette-type ribbon, and comes with both serial and parallel ports. List price: $1995.
Amdek Corp.
2201 Lively Blvd.
Elk Grove Village, IL 60007
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KX-P 1092
A bidirectional, logic-seeking dot matrix printer, KX-P 1092 prints up to 180 characters per second in

Model KX-P 1092 Printer, Panasonic

both pica and elite, with modes for graphics, draft, or near letter quality output. The printer has both tractor and friction feeds and accommodates paper from 4 to 10 inches wide. A parallel port is standard; a serial port is optional. List price: $599.
Panasonic Industrial Co.
1 Panasonic Way
Secaucus, NJ 07094
201/348-7183, 201/392-4322

Storage Devices

Super XT
The Super XT is a cartridge disk subsystem with two 5MB 5¼-inch drives that provide unlimited off-line storage. The product includes

Super XT, Datrex

an adapter board, a power supply, a cable, and a device driver for DOS 2.00 or 2.10. List price: $1995.
Datrex, Inc.
3536 W. Osborn Rd.
Phoenix, AZ 85019
602/272-9491

Apollo 30MB Hard Disk Drive
An internally mounted hard disk drive system with 30MB of storage, the Apollo Drive requires no special software drivers and comes with the manufacturer's SandStar Hard Disk Controller Card. Features include read/write heads that protect information automatically when the power is turned off; complete shock-mounting; low-

Apollo Hard Disk, Maynard Electronics

noise operation; and a power supply that clips onto the back of the PC. List price: with multifunction controller board $2995, with floppy and hard disk controller board $3195, with RAM controller board $3195.
Maynard Electronics
400 E. Semoran Blvd. #207
Casselberry, FL 32707
305/331-6402

DataSystem
DataSystem is a combination hard disk and tape backup system for the PC and the XT, available in 10MB, 21MB, 32MB, and 40MB capacities, with a built-in 24MB tape backup. Features include compressed or full-volume backup, file-by-file or full-volume restore, and automatic flaw mapping for media interchangeability. Password protection is available with Davong's *Multi-OS* software. List price: $3295 to $4995.
Davong Systems, Inc.
217 Humboldt Ct.
Sunnyvale, CA 94086
408/734-4900

Miscellaneous

Computer Security Alarm
Designed to prevent the theft of a PC or an XT, this alarm attaches to the back of the computer. When triggered, its sensitive motion-detection circuit sets off a piercing dual-tone siren. The alarm also protects the monitor, the keyboard, the printer, and an external hard disk by locking their cables into the motion-detection system. The unit comes with metallic warning labels and two seven-pin tumbler keys for relocating the device. List price: $99.
MicroComputer Accessories, Inc.
5721 Buckingham Pkwy.
Culver City, CA 90230
213/641-1800

Computer Security Alarm, MicroComputer Accessories

PC Reset
A logic board that eliminates the need to use the power switch as a reset button when the keyboard is locked out, PC Reset also can save time by bypassing the RAM check when the PC is turned on. The board does not require a system slot; it mounts through the rear panel of the PC and plugs into existing cables. An optional remote control unit with a push-button switch can be placed near the keyboard. List price: PC version $44.95, PC XT version $49.95, remote control unit $29.95.
PC Innovations, Inc.
P.O. Box 4374
Cherry Hill, NJ 08034
609/784-1133

PC Reset, PC Innovations

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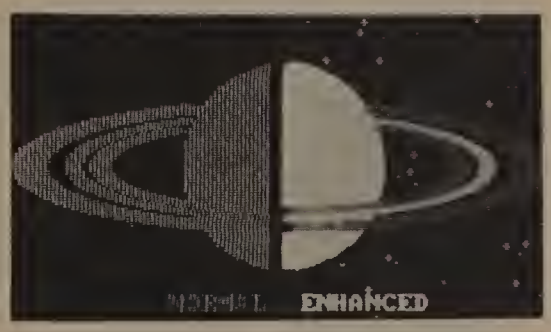
Model 100-2124-00 Video Enhancer
An external device that connects a PC or compatible to any standard high-resolution monochrome monitor (except the IBM Monochrome Display), the Video Enhancer eliminates grainy texture and highlights text for programs designed to display color graphics. It converts the RGB color signal to 16 shades of gray, amber, or green,



Model 100-2124-00 Video Enhancer, Power-R

depending on the color of the monitor. The device also amplifies the video signal for increased maximum brightness or for parallel operation of up to six monitors. The Video Enhancer works with the IBM Color/Graphics Adapter, the Amdek MAI, the Plantronics ColorPlus, the Tecmar Graphics Master, and other RGB video boards. List price: $79.95.
Power-R Inc.
4016 Interlake N
Seattle, WA 98103
206/547-8000

System Software

Utilities

Lemma Shell
A DOS command processor that lets you reuse and edit commands without retyping them, *Lemma Shell* also provides features from other command processors, particularly the C shell for UNIX. These include a command history for reusing any of the last 24 commands, a directory history for moving between directories without retyping path names, command line editing, global file-name character expansion, command completion from an initial string, and function-key redefinition. *Lemma Shell* has enhanced some DOS commands and added others, including commands for time and date, idling, and counting characters, words, and lines in a file. List price: $55. Requirements: 192K, one disk drive.
Lemma Systems, Inc.
1508 Calle del Ranchero NE
Albuquerque, NM 87106
505/268-7220

Diskette Filing System
Designed to keep track of files on multiple disks, the *Diskette Filing System (DFS)* lets the user inventory a disk by inserting it into a drive and pressing a key. Files listed in the inventory can be searched by file name, file name extension, disk label, or global file names. The program supplies the disk label, file name, and date of file creation. *DFS* also prints labels for disks or disk jackets, listing files in alphabetical order. List price: $20. Requirements: 128K, two disk drives.
Zeit-Geist Systems
414 S. Elm St.
Saginaw, MI 48602
517/791-3036

Application Software

Communications

PC102
A terminal-emulation program with file transfer capabilities, *PC102* provides full keyboard and screen emulation of DEC VT-102, VT-101, VT-100, and VT-52 terminals. Each VT terminal key equivalent can be generated with a single keystroke, and key-top charts are included in the package. *PC102* also offers printer support and a status line. List price: $139. Requirements: 64K (96K for DOS 2.00 and 2.10), one disk drive.
General Micro Systems
7525 Mitchell Rd. #101
Minneapolis, MN 55344
612/937-9194

Conexus

Conexus is an integrated electronic mail, computer teleconferencing, and bulletin board system. It allows users with manager access to institute new bulletin boards that can search for items by keyword. The package includes a member directory, outline explanations, and menus for both new and experienced users. List price: $624. Requirements: 256K, hard disk, Hayes-compatible modem.
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Gradebook

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Microvest
P.O. Box 272
Macomb, IL 61455
309/837-4512

Rory Tycoon Portfolio Manager
A financial planning template for *1-2-3*, this program evaluates the relative performance of various investments. It calculates the present and future value of each investment, profit or loss, net worth, rates of return, yields to maturity, margin requirements, weighted averages, and portfolio distributions. *Rory Tycoon* also tracks investments in stocks, options, bonds (including zero-coupon instruments), cash accounts, certificates of deposit, precious metals, mutual funds, commodity futures, IRAs, and employee profit-sharing plans. List price: $19.95. Require-

ments: 192K (256K for DOS 2.00 and *1-2-3*, version 1A), two double-sided floppy disk drives or one double-sided floppy and one hard disk drive, *1-2-3*.
Coherent Software Systems
311 W. 21st St.
Houston, TX 77008
713/869-0465

Graphics

ChartStar
A business presentation graphics program, *ChartStar* produces a variety of charts, including text (with nine choices of fonts), line (linear or logarithmic), pie (four types including three-dimensional), bar (six types including stacked, side-by-side, and three-dimensional), organizational, scatter, curve-fitting (linear, logarithmic, exponential, and power functions), and Gantt (up to five time scales). *ChartStar* reads data from *InfoStar, 1-2-3, Multiplan,* and other programs. List price: $395. Requirements: 192K, two disk drives.
MicroPro International Corp.
33 San Pablo Ave.
San Rafael, CA 94903
415/499-1200

PC Paintbrush
A mouse-driven, free-form painting program with 14 tools, five pull-down menus, and 30 backgrounds, *PC Paintbrush* provides the PC and the PCjr with capabilities similar to those offered by the *MacPaint* program for the Macintosh computer. In addition to a variety of colors and patterns, six fonts can be manipulated in seven styles and seven sizes from 9 to 72 points. *PC Paintbrush* supports seven graphics boards and 17 printers and plotters. List price: $150. Requirements: 192K (256K for PCjr), one disk drive, DOS 2.00 or 2.10, mouse (Summagraphics, Mouse Systems, or Microsoft) or joystick, color graphics board (e.g., Amdek, IBM, PCjr, Quadram, Scion, or Tecmar).
IMSI (International Microcomputer Software, Inc.)
633 Fifth Ave.
San Rafael, CA 94901
415/454-7101

Integrated Applications

IOAS-2
An integrated office automation system for the PC, the XT, and the PCjr, *IOAS-2* consists of three modules that can be purchased together or separately. The *Exec-I* module has seven applications: appointments, stock security, mailing lists, checks, personal finances, personal inventory, and memos. *Word-X* is a word processor with a full-screen editor. *SS* is a spreadsheet that lets you specify column widths, colors, and display formats. List price: $149, each module $59. Requirements: 128K, one disk drive.
Micro Architect Inc.
6 Great Pine Ave.
Burlington, MA 01803
617/273-5658

Job and Industry Specific

FitScrip
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HealthTech Corp.
7005 St. Anne's Ave.
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301/459-0776

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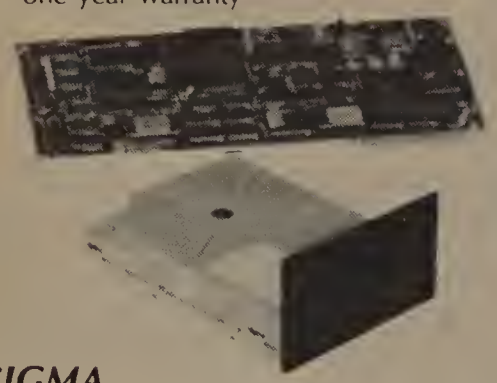

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Oracle, Inc.
Box 550
Chelsea, MI 48118
313/572-9379, 313/475-3600

Personal Management

Electronic Calendar

Designed for use until the year 2000, *Electronic Calendar* displays and prints a monthly calendar, highlights important dates, and accommodates up to ten daily messages, such as reminders of meetings, bill payments, important anniversaries, and birthdays. The program can also determine the day of the week for future events. List price: $29.95. Requirements: 64K, one disk drive, monochrome display.
Home Software Systems
P.O. Box 381557
Germantown, TN 38183-1557

Master Control

A diet and exercise program that runs on the PC and the PCjr, *Master Control* provides a comprehensive approach to weight management for the serious dieter. Dieters can monitor calorie intake and expenditure, using a data base containing caloric values for more than 3000 foods, including name brands and junk food, plus information on more than 100 exercises. The program provides graphics reports on weight-loss progress. A 95-page manual has information on nutrition and guidelines for developing a personal diet and fitness program. List price: $69.95. Requirements: 128K, one disk drive, 80-column monitor.
Healthware
Physicians Plaza
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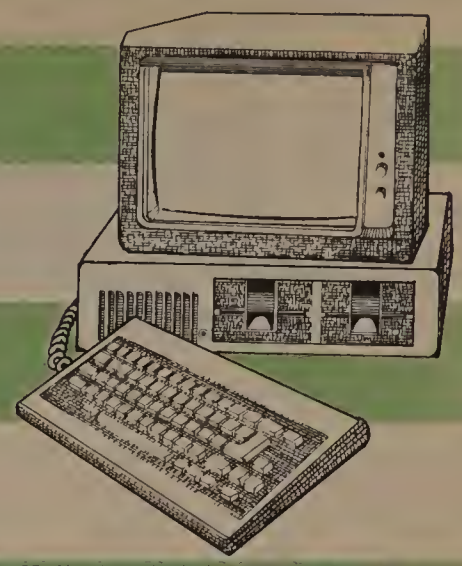

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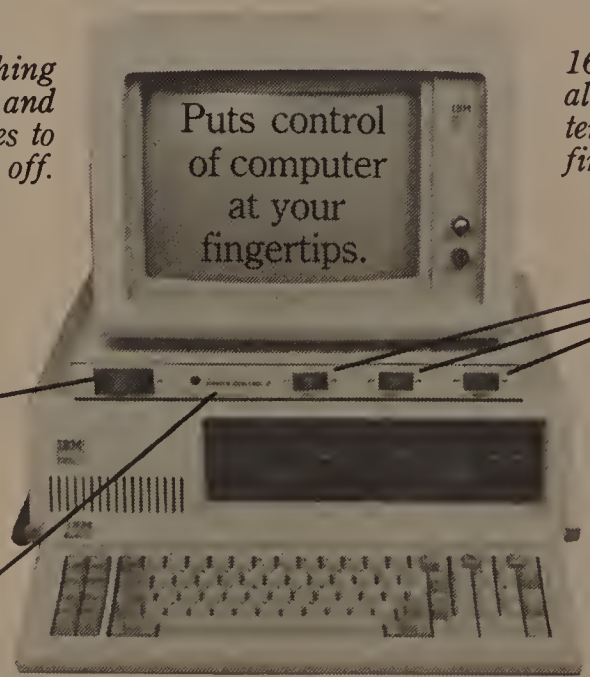

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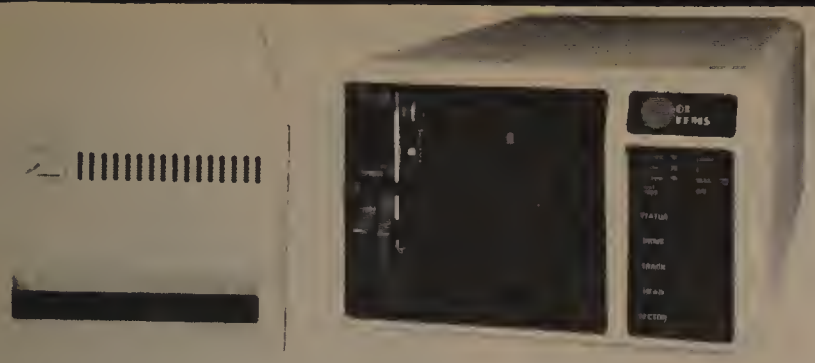

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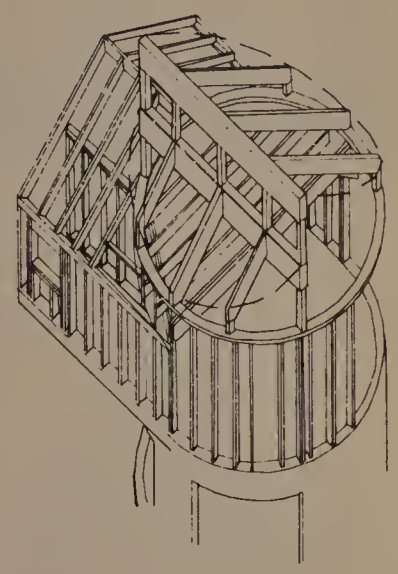

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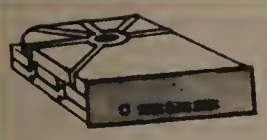

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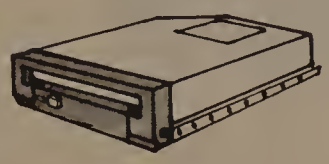

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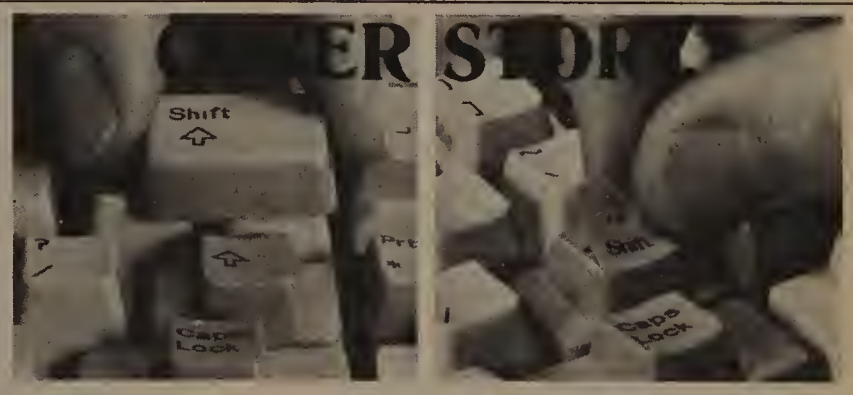

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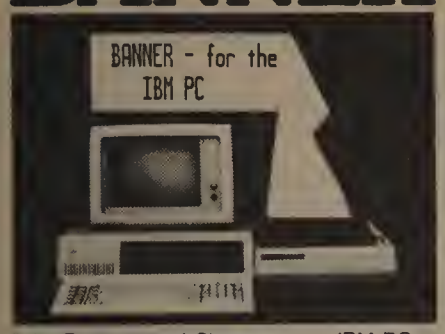

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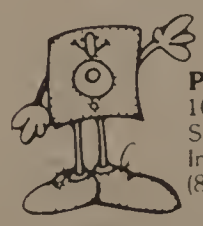

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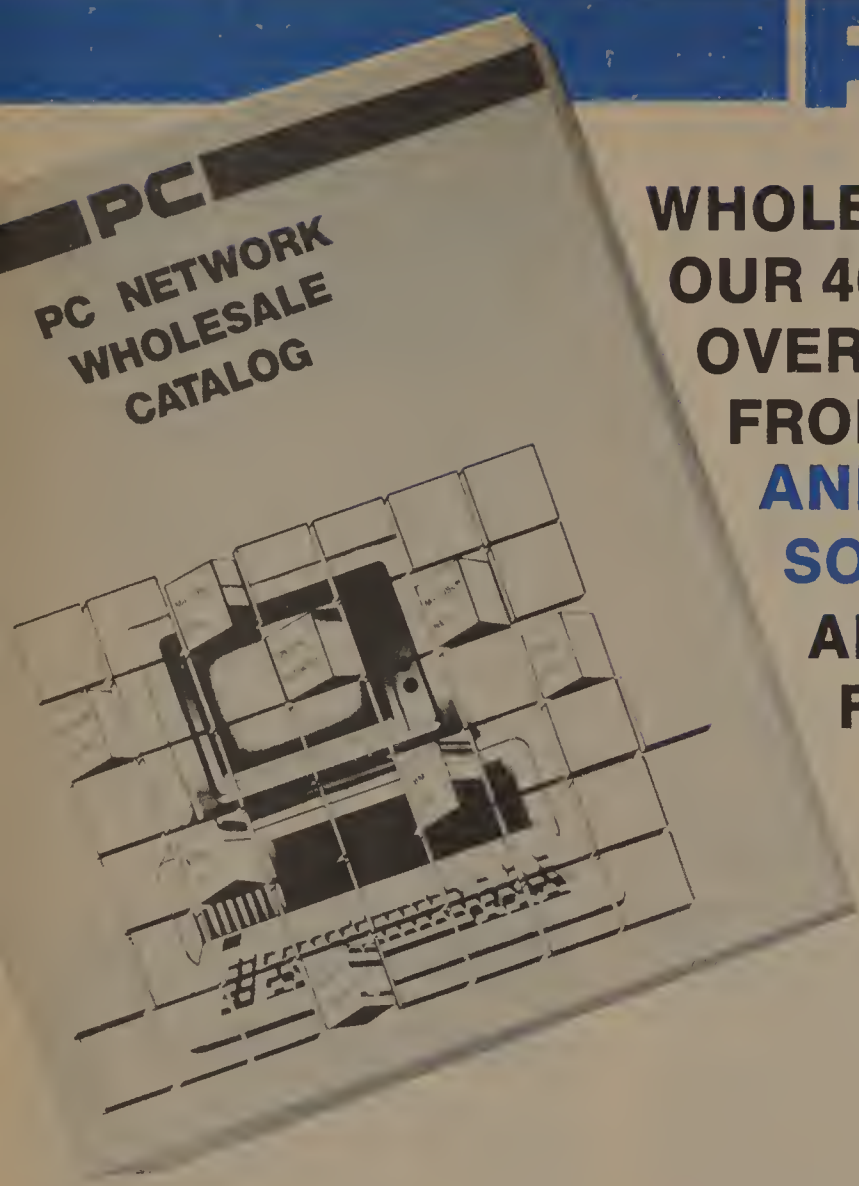

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Brodarbund *Lode Runner*	19.75*
CBS *Goren-Bridge Made Easy*	46.00*
CBS *Mastering the SAT*	61.00*
Epyx *Temple of Apshai*	21.97*
Infocom *Zork I or Witness*	21.50*
Infocom *Deadline or Suspended*	27.00*
Microsoft *Flight Simulator*	27.00*
Orion *JBird (QBert Look Alike)*	22.00*
Scarborough *Mastertype*	27.00*
Screenplay *Asylum (works with mono card too)*	15.50*
Sierra On-Line *Frogger*	21.00*
Sierra On-Line *Crossfire*	16.00*
SubLogic *Night Mission Pinball*	24.00*
Spinnaker *Alphabet Zoo*	17.00*
Spinnaker *Delta Drawing*	29.00*
Spinnaker *FaceMaker*	20.00*
Spinnaker *Hey Diddle Diddle*	17.00*
Spinnaker *KinderComp*	17.00*
Spinnaker *Rhymes & Riddles*	17.00*
Spinnaker *Story Machine*	20.00*
Spinnaker *Most Amazing Thing*	23.00*
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ATI *How to use Microsoft: Word*	42.00*
ATI *How to use Lotus 1-2-3*	42.00*
► **Ashton-Tate** *DBASE III*	347.50*
► **Ashton-Tate** *Framework*	347.50*
Ashton-Tate *Friday!*	156.00*
Central Point *Copy II PC*	23.00*
Conceptual Instruments *Desk Organizer*	177.00*
Cosmos *Revelation (Requires 8087)*	575.00*
Digital Research *CP/M-86*	33.00*
Digital Research *DR Logo*	57.00*
Digital Research *PL/I Compiler*	399.00*
Digital Research *Concurrent CP/M—Windows*	90.00*
Funk Software *Sideways*	36.00*
Harvard *Harvard Project Manager*	215.00*
► **Hayes** *Smartcom II—New UTIOO Emulator*	66.00*
Human Edge *The Management Edge*	145.00*
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Microsoft *C Compiler*	275.00*
Microsoft *Word with Mouse—Latest Version*	255.00*
Microsoft *Multiplan*	105.00*
Monogram *Dollars & Sense*	69.90*
► **Multimate** *Multimate (Latest Version)*	240.00*
Oasis *The Word Plus*	90.00*
Open Systems *P/O Sales A/R INV G/L A/P Team Mgr*	370.00*aa
RDS *Informix*	510.00*
Real World *G/L A/P A/R P/R or OE/INV*	367.50*aa
Rosesoft *Prokey Version 3*	74.00*
Ryan McFarland *RM COBOL (Dev. System)*	570.00*
Samna *Samna III Word Processor*	325.00*
Satellite Software *WordPerfect*	210.00*
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Softstyle *SET-FX*	35.00*
Software Publishing *PFS: File*	72.00*
Software Publishing *PFS: Report*	64.00*
Software Publishing *PFS: Write*	72.00*
Software Publishing *PFS: Graph*	72.00*
TCS *Client Ledger*	730.00*
Verbatim *Disk Drive Analyzer*	25.00*

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(Please add shipping and handling charges found in italics next to price.)

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Apple *Macintosh Base System*	1,560.00*	*(34.12)*
Apple *Apple //c*	660.00*	*(18.58)*
Apple *Apple //e*	CALL	
Columbia *Desktop & Portable Systems*	CALL	
Compaq *All Models*	CALL	
Eagle *Desktop PC and Spirit Portables*	CALL	
► **IBM PC Starter System 1 DSDD/ FDC/Color CD/Par Port/Monitor/64K**	1,642.00*	*(35.47)*
► **IBM PC Base System 2 DSDD/FDC/256K**	1,625.15*	*(35.10)*
► **IBM PC Professional Hard Disk (XT) (1 DSDD/FDC/10 MB Hard Disk/256K)**	2250.15*	*(48.60)*
IBM PC/AT All Configs	CALL	
Sanyo *MBC 550 "Lowest Cost Compatible"*	640.00*	*(13.82)*
Tava *PC Complete IBM Compatible (64K/Color or Mono Card/2 drives)*	1,450.00*	*(31.32)*
Texas Instruments *Professional*	CALL	

DISK DRIVES & CONTROLLERS

► **Cogito** *1/2 Ht Low Power 10MB Winchester W/IBM Controller*	735.00*	*(15.83)*
IBM *Floppy Disk Controller*	75.00*	*(2.50)*
► **Maynard** *WS-1 10MB Internal Hard Disk with Sandster Multi Function Card*	770.00*	*(18.15)*
► **Maynard** *WS-2 same as WS-1 but with Sandster Floppy Controller (uses 1 slot)*	930.00*	*(20.30)*
Maynard *Floppy Controller/Serial Port*	145.00*	*(2.50)*
► **Panasonic** *Half Height DSDD Drive Pair*	225.00*	*(5.40)*
Quma *Half Height DSDD Drive Pair (Same as used on IBM Portable)*	350.00*	*(7.00)*
► **Tandon** *TM100-2 Full Height DSDD Drive*	153.00*	*(3.18)*
► **Tandon** *10MB Internal Winchester w/IBM Controller*	685.00*	*(14.80)*
► **Tallgrass** *20MB External Hard Disk with Tape Backup*	2,150.00*	*(48.44)*
Teac *FD55-B Half Height DSDD Drive Pair*	265.00*	*(5.72)*

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All chips guaranteed for life.

► **64K Memory Upgrade Kits (9 Chips)**	35.55*	*(1.00)*
► **64K Dynamic Ram Chips (Each)**	3.95*	*(1.00)*
256K Dynamic Ram Chips (Each)	33.00*	*(1.00)*

MODEMS

Anchor *Mark XII LOWEST PRICE 1200BPS HAYES COMPATIBLE EXTERNAL MODEM!*	230.00*	*(5.00)*
Hayes *Smartmodem 300*	160.00*	*(3.60)*
Hayes *Smartmodem 1200B with new Smartcom II VT100 Emulator*	366.90*	*(2.50)*
Rixon *R212A Stand Alone 1200BPS*	335.00*	*(8.50)*
U.S. Robotics *Password (Compact 1200BPS External)*	290.00*	*(6.50)*

MONITORS

Amdek *Video 300G Composite Green*	110.00*	*(3.00)*
Amdek *Video 300A Composite Amber*	120.00*	*(3.00)*
Amdek *Video 310A IBM Type Amber*	130.00*	*(3.00)*
Amdek *Color 300 (NEW!) Composite*	215.00*	*(4.84)*
Amdek *Color 500 (NEW!) Composite/RGB/VCR*	320.00*	*(8.91)*
Amdek *Color 600 (NEW!) High Res RGB*	395.00*	*(8.53)*
Amdek *Color 700 (NEW!) Ultra High Res*	455.00*	*(9.83)*
Amdek *Color 710 (NEW!) 700 w/Non-Glare/Long Phosphor*	485.00*	*(10.48)*
Princeton *HX-12 RGB Monitor*	CALL	
Princeton *MAX-12 IBM Mono*	CALL	
Princeton *SR-12 Ultra High Res RGB*	CALL	
► **Quadram** *Quadchrome II NEW! 640x200 RGB w/14" Screen/ Black Phosher Mask/IBM Case*	370.00*	*(8.21)*
Taxan *420 Super High Res RGB Monitor*	360.00*	*(8.21)*
Taxan *440 Highest Res RGB (720x400) Currently Available Works With Parsyst Gob Card*	525.00*	*(11.34)*
Zenith *ZVM-123 Green High Res (Consumer Reports Rated Best Buy!)*	76.00*	*(2.50)*

MULTIFUNCTION CARDS

Apparat *256K Memory Board with OK*	67.00*	*(2.50)*
Apparat *Combo II w/ser/par/game/ clock/sfwr*	123.00*	*(2.50)*
► **AST** *Six-Pack Plus with OK*	197.00*	*(2.50)*
AST *MegaPlus II with OK*	205.00*	*(2.50)*
AST *I/O Plus II*	105.00*	*(2.50)*
► **ORCHID BLOSSOM W/64K** *Multifunction with networking at an unbelievable price. Up to 384K/ Ser/Par/Clock/Software/Net Slot*	205.00*	*(2.50)*
► **Quadram** *Improved Quadboard w/OK*	199.00*	*(2.50)*
Tecmar *Captain Multifunction Card O/K*	195.00*	*(2.50)*

PRINTERS

Amdek *5025 (NEW!) 25CPS LQ w/2K Buffer*	525.00*	*(10.48)*
C. Itoh *F10/40 Starwriter 40 CPS LQ*	675.00*	*(18.90)*
C. Itoh *Prowriter 8510 AP*	265.00*	*(6.16)*
Epson *RX-80*	267.00*	*(8.00)*
Epson *FX-80*	415.00*	*(9.25)*
Epson *FX-100*	600.00*	*(14.35)*
Epson *LQ1500*	CALL	
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NEC *2030 20CPS LQ Parallel*	625.00*	*(16.53)*
NEC *2050 20CPS Letter Quality Printer*	675.00*	*(14.58)*
NEC *3530 33CPS LQ Parallel*	1,165.00*	*(31.54)*
NEC *3550 33CPS Letter Quality Printer*	1,315.00*	*(24.40)*
NEC *8850 55CPS LQ New Model IBM Version*	1,710.00*	*(36.94)*
Okidata *ML84P 200CPS 132 Col*	720.00*	*(16.00)*
Okidata *ML92P 160CPS 80 Col Printer*	395.00*	*(8.55)*
Okidata *ML93P 160CPS Wide Platen*	590.00*	*(15.00)*
Okidata *2410P Pacemark 350CPS*	1,650.00*	*(80.00)*
Okidata *IBM-to-Okidata Parallel Cable*	20.75*	*(1.00)*
Quma *Sprint 11/45 45CPS Letter Quality*	1,155.00*	*(24.00)*
Quma *Sprint 11/90 90CPS Letter Quality New! Fastest Daisywheel Out!*	CALL	
Quma *IBM Cable and Interface (required)*	72.00*	*(1.00)*
► **Star Micronics** *Gemini 10X 120 CPS w/Tractor Epson Graphics Compatible*	225.00*	*(4.86)*
► **Star Micronics** *Gemini 15X 10X Features w/132 Col*	325.00*	*(7.02)*
► **Star Micronics** *Powertype 18 CPS LQ Diablo Code Compatible*	300.00*	*(8.48)*
Texas Instruments *855 DP/LQ w/Tractor*	716.00*	*(15.50)*
Toshiba *P-1340 80 Col Version of P-1351*	696.00*	*(15.03)*
Toshiba *P-1351 160/100 CPS Draft/LQ LQ Printer*	1,200.00*	*(25.92)*

VIDEO CARDS

► **Amdek** *MAI Card*	310.00*	*(2.50)*
Eagle *Monochrome Display Card*	160.00*	*(2.50)*
► **Hercules Monochrome Graphics Card**	296.00*	*(2.50)*
Hercules *Color Card with Parallel Port*	149.90*	*(12.50)*
► **Paradise** *New Modular Multidisplay Card*	CALL	
Parsyst *Bob Card Ultra High Res Color Card with Mono Quality Text in Color*	365.00*	*(2.50)*
Quadram *Quadcolor I Color Card*	170.00*	*(2.50)*
Quadram *Quadvue Mono Card w/Ser/Par/Clock*	210.00*	*(2.50)*
STB *Graphix Plus II NEW! (simultaneous Mono Graphics & Color)*	295.00*	*(2.50)*

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IBM PC w/64K (256K capacity) **$1,642.00*** *(35.47)*

Floppy Drive Controller
1 Double Sided Double Density 320/360 Disk Drive
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2 Double Sided Double Density 320/360K Disk Drives

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IBM PC w/256K

Floppy Drive Controller
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Automatic Hard Disk Boot Feature

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TANDON TM100-2 DRIVES **153.00***

TALLGRASS TG3020 ..... **2150.00***
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1/2 Height Disk Drives with Mounting Kit

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PC NETWORK

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Once again, as Federal Express picks up our ad at the very last millisecond before this issue's advertising deadline, ***here we sit with dozens of price reductions and new product announcements which have arrived too late for us to let you know.***

Why, our ad manager asks, do we always go through a last minute price update frenzy, just seconds before our ad is due at the publisher, when we know that despite our heroic effort, ***many of these products will cost even less by the time you read this ad.***

How she asks, can we get a crystal ball to forecast what fantastic promotions and specials our suppliers are going to offer from now to the date this ad gets to the newsstand ***over two months from today?***

Well, we decided that she has a good point. While we'll still keep getting our grey hairs and ulcers from last minute revisions, we will start publishing this notice and ask our readers to make a simple check. Look at any four back issues of this magazine (*yes we're in every one)* and track the prices on the most popular products. ***You will see that many drop with every issue.*** Most of these price changes were instituted well before the issue was printed and ***our members always pay the lower price.*** This should prove that this notice is much more than hype.

Given the current madness in the PC industry with its spur of the moment pricing and instant product introductions, ***you will find it always pays to call for our latest prices.*** You will be glad you did.

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11 DISCOUNT BOOK LIBRARY—Working with numerous publishers and distributors, The NETWORK has assembled a library of over 1000 computer related books and manuals at savings of up to 75% from the normal store price.

12 MEMBERSHIP REFERRAL BONUS—Our most valuable source of new members is you! To date almost 40% of our members have been referred by word of mouth from other satisfied members. For those of you who refer new members, The NETWORK will credit a cash bonus to your account applicable to any future purchase.

13 CORPORATE ACCOUNT PROGRAM—Almost 50% of The NETWORK's members are corporate buyers and users *(see opposite page left).* The NETWORK can establish open account status and assign designated account managers to expedite orders, and coordinate multiple location shipments.

14 QUANTITY DISCOUNTS—For large corporations, clubs, and repeat or quantity buyers The NETWORK can extend additional single order discounts, when available to us from our manufacturers and distributors.

15 PRICE PROTECTION—The PC Industry is crazy!! Prices change not yearly or monthly or even weekly but often day by day! These changes are sometimes up *but are mostly down!!!* **THE NETWORK GUARANTEES THAT IN THE EVENT OF A PRODUCT PRICE REDUCTION, BETWEEN THE TIME YOU PLACE YOUR ORDER AND THE TIME THE PRODUCT SHIPS YOU WILL ONLY PAY THE LOWER AMOUNT!!**

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PC World Directory *is a comprehensive listing, by category, of products and services for the IBM PC, look-alikes, and compatibles. It provides rapid access to the burgeoning PC marketplace for both readers and advertisers.*

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Protect your PC & XT investment with our sturdy, clear antistatic vinyl dust covers. 2 piece set. (One covers monitor/system unit, one covers keyboard.) Only $15.95. $1 s/h. Visa/MC/chk. Printer & other covers avail. Call/write to order. Free catalog of unique & useful accessories. *SGW Enterprises, Inc., 722-J Genevieve St. Dept. W, Solana Beach, CA 92075, 619/755-8324*

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Beautiful, hand-made, quilted dustcovers. A classy alternative to vinyl. Vinyl can damage machines by retaining heat. These covers are anti-static & machine washable. Offered in six colors: grey, chocolate, cream, wine, navy, & rust. Perfect Christmas gift. Prices from $20. Send for brochure. *Covers A Lot, P.O. Box 369, La Honda, CA 94020, 415/747-0352*

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Stamp Collectors
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Tax Preparation
1984 Federal tax program follows IRS forms and includes form 1040, sch. A-G, R, RP, SE and W, and forms 2106, 2119, 2441, 3468, 3903, 4562, 4797, 4835, 4952, 4972, 5695, and 6251. Available for the IBM PC, PCjr, TI Pro. and DEC Rainbow with MS-DOS. Req. 128K. Price: $99; updates $29. Check/MC/Visa. *Dunphy Systems Inc., 2215 Deewood Dr., Columbus, OH 43229, 614/891-2131*

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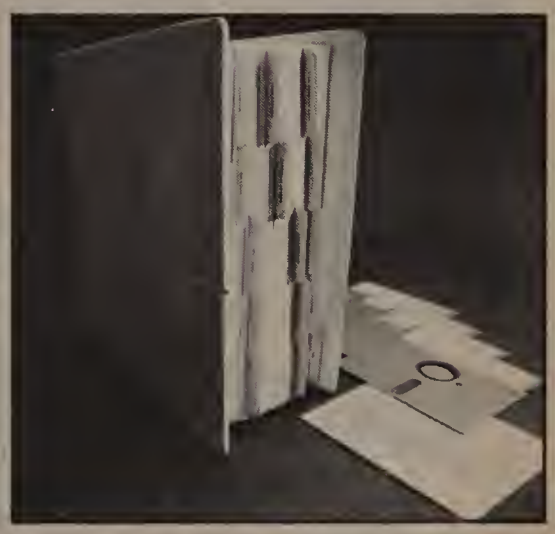

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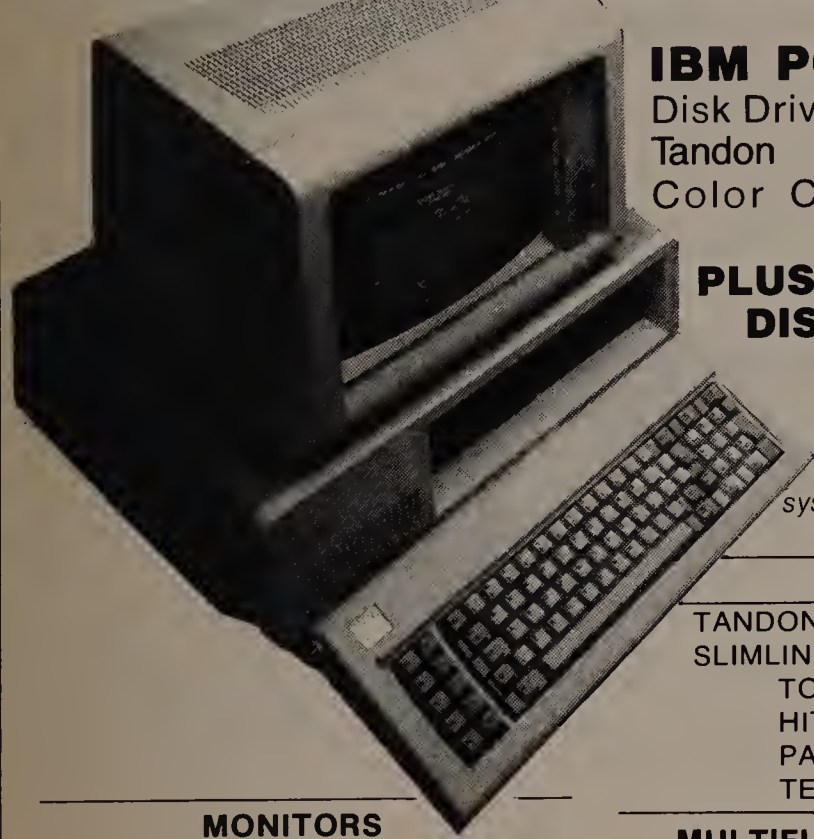

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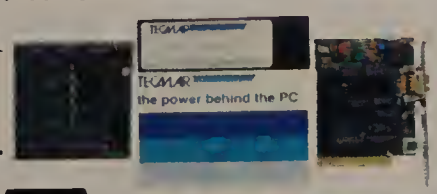

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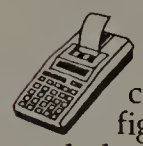

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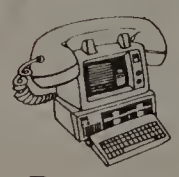

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